December 1959
approach
NAVAER 00-75-510
THE NAVAL AVIATION SAFETY REVIEW

In these hectic, fast-moving days of changes, fixes and moods, one of the few things we can predict with reasonable certainty is that January will surely follow December.

We could make a prediction about which way the accident rate curve will bend after December too, but with somewhat less certainty.

For the past *ten years* the curve has taken a turn upward in January. Back in fiscal year 1957 the increase in January's rate over December's was nearly 50%. The following year the increase was only 33%, and last January's rate was barely 10% greater than December's.

So you can see why we're hesitant to make a guess about this coming January. This *could* be the first time in a decade that the accident rate takes a downward turn in January. We know it can be done. It can be done by planning and scheduling January's operations *now*, to provide for a more gradual, more moderate transition into the operational working cycle. But whether or not it will be done depends on that and a number of variables, plus a few constants. Like constant adherence to SOP, and constant practice of good flight planning procedures.

Back in the December 1958 APPROACH, Headmouse said that you don't race a horse on the day he completes a cross-country van ride—not only is he unlikely to win, place or show, he's likely to stall out and spin in. Even more likely if his jockey has been using his R&R to the hilt. Both the horse and the jockey need a few fam laps around the track before they're sent in there to win.

January is a big go-get-'em month; Christmas leaves are over, big schedule to meet, ready decks are at sea again, and deployment coming up soon, so fly, men, FLY! But wait!—think of the race horse and his jockey—and then think of your winged horse and his G-suited jockey. We're willing to make this much of a prediction: The accident rate may or may not go up in January, but it will be lower if pilots and men and airplanes are eased back into full-time operations with a grain of moderation.

A happy SAFE Christmas and a happy SAFE New Year. . . .

the editors

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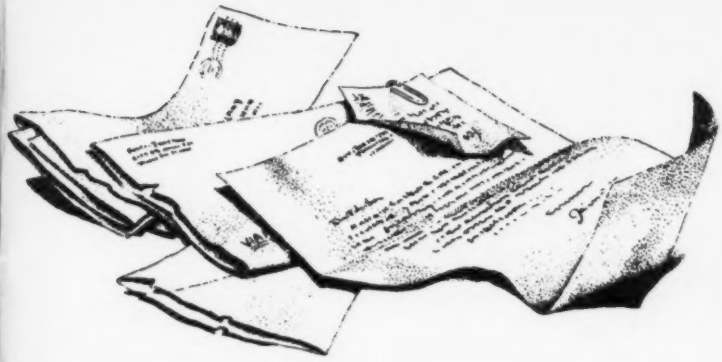


Letters

Nourishment Kit

Sir:

A disposable plastic bag, procured from a local surgical supply house, and some standard Navy intravenous tubing, were combined to form an "in flight nourishment kit."

The development was made to accommodate pilots who ferry *Skyhawks* to the Sixth Fleet, a nonstop flight of approximately five and one-half hours from Quonset Point, R. I., to the Azores.

During the long crossing, pilots experience a drying out effect which is caused by the continual breathing of oxygen. Either water or fruit juice provides enough nourishment to overcome this effect.

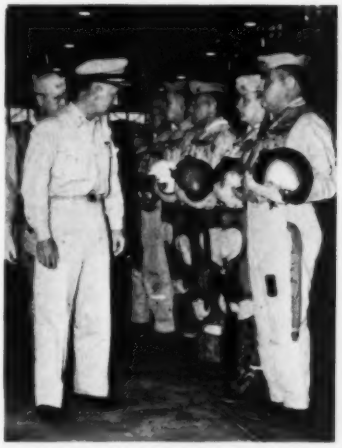
In a low pressure chamber under simulated altitude runs of 35,000 feet, the bag was put to the test. It was able to withstand the six-fold expansion of air at these altitudes, even when filled with 10 ounces of air! This eliminated any possibility of mid-air explosion.

When a pilot is on a long flight he merely has to reach for the plastic tubing, slip the end of it under his mask and into his mouth, release a clamp, and drink his fill.

VA-44

An unusual inspection with a life saving purpose held by ATU-203, NAAS Chase Field, Beeville, Texas. Personnel lined up in the usual formation, but, instead of sparkling white uniforms, the pilots and flight students wore G-suits and "hard hats" —it was a safety flight gear inspection.

Aviation Safety Officers gave the flight gear a thorough going over to see that it was in top condition, ready for the rigors of jet flight.



Help Wanted

Sir:

It was a beautiful day in the Aleutians and two qualified??? plane commanders, with a crew of three and two spare pilots along for checkout left the field at Adak. The aircraft, a UF-2, recently acquired to replace UF-1s, gross weight 32,000 lbs. Takeoff was uneventful from the field with a south wind of 15 knots. Upon arrival over the landing site (a lake two miles from the field) a check of the wind showed well-defined wind streaks running from north to south. An uneventful landing was made and one of the qualified pilots climbed out of the seat to allow one of the unqualified pilots in the seat for water handling training.

For some reason or other this airplane had a tendency to weathercock downwind and was very reluctant to get up on the step for taxiing into the wind. After some cockpit consultation, it was decided to verify the wind streaks with a float light. Lo and behold the wind was blowing 180 degrees out of phase with the main base. The flight was then completed without further incident except that the plane was rather sluggish getting on the step for takeoff.

VOLUME 5 APPROACH—THE NAVAL AVIATION SAFETY REVIEW NUMBER 6

Purposes and Policies: APPROACH is published monthly and contains the most accurate information currently available on the subject of aviation accident prevention. Contents should not be construed as regulations, orders, or directives. Material extracted from Aircraft Accident Reports (OpNavs 3750–1 and 3750–10), Medical Officer's Reports (OpNav 3750–8) and Anymouse (anonymous) Reports may not be construed as incriminating under Art. 31, UCMJ. Photos: Official Navy or as credited.

Non-naval activities are requested to contact NASC prior to reprinting APPROACH material.

Correspondence: Contributions are welcome as are comments and criticisms. Views expressed in guest written articles are not necessarily those of the Naval Aviation Safety Center.

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Several weeks later, an Air Force handbook on the SA-16B was located and another light came ON. Maximum water operating weight for the aircraft as far as the Air Force was concerned was 29,500 lbs.

Prior to the flight, indeed when the UF-2s were accepted, attempts were made to procure UF-2 Handbooks and load adjusters.

The downwind landing situation can be alleviated by use of a smoke light to verify "Seaman's Eye wind" but until operating activities are provided with full and complete operating instructions regarding maximum gross weights and restrictions, a loaded gun is operating under the name of the UF-2. Please get some help out.

C. C. CHRISTIANSEN, LT
Seattle

● **The UF-2 is capable of operation at higher gross weights than the UF-1. BuAer states the UF-2 Flight Manual is now being prepared and will be available for distribution in the very near future.**

RECORD ESCAPE—Lt.(jg) H. J. Terrill, VF-41, demonstrates how he successfully cut his way through a closed F3H-2 *Demon* canopy in 12.8 seconds. Fully strapped into the cockpit wearing standard summer flight gear including mae west, hardhat (with visor lowered to protect his eyes), oxygen mask and survival knife, the pilot, upon signal, unfastened his lap belt, disconnected oxygen and radio connections. Wielding his knife firmly with both hands, pointed-upward, he made three powerful jabs. On the first thrust a 15" x 8" piece of plexiglass broke free from the canopy. The next two strokes readily cleared enough of the canopy to permit the pilot to stand up and climb out of the cockpit.

Most observers were amazed with the apparent ease with which the pilot was able to penetrate and break away the plexiglass. A new pilot survival knife which is presently undergoing evaluation was used; however a similar escape from another F3H-2 canopy was made using the standard Navy survival knife. Less than one-quarter inch of the tip was broken from each knife; no other damage was incurred; both knives were still usable.

Crash Chart

Sir:

Just got our advance copy of the new crash and rescue manual for the *Phantom II* (F4H). This is the finest thing since _____.

It is of a size where the crash supervisor can carry it in his truck for ready reference and pass info in to the men by bullhorn in case they are having trouble. The manner in which it is indexed for ready reference doubles its usefulness. Subject matter is covered as fully as necessary and properly subdivided.

For both the indoctrination of new crash crewmen and for use at the scene of the crash, this book is the best by far. New features, such as a chart showing location of all magnesium, show a true appreciation of the crash crew problem by the aircraft manufacturer. If copies of similar type were available for all operating aircraft and were in the hands of the crash crew personnel, I should face a crash situation with more assurance, either in my job here or as a pilot.

In the interest of getting the ball rolling along this line, I have shown this book to all factory reps I can find and pointed out the obvious advantages and superiority of this presentation. They have agreed that McDonnell has a good thing going here. I hope they are encouraged to build up similar books.

R. M. SPARKS, CDR
Leeward Pt.

● **NASC concurs and copies of this letter are being distributed to all aircraft contractors.—Ed.**

Tracking in FOD

Sir:

. . . In the September issue of APPROACH is the article *"Foreign Object Damage."* In outlining some "Do Nots" to help any prevention program, I noticed the mention of the study and compiling methods of preventing foreign objects from being blown, tracked, or washed into operational areas.

I was particularly interested in that word "tracked." Here at NAS Whidbey Island a re-surfacing program is in progress on the access roads, streets, etc. The procedure is to spray a coat of asphalt over the existing road surface followed by an application of crushed rock. This rock is supposed to work into the asphalt and in effect produce a new "built-up" layer for the surface. I noticed, with much regret, that a great amount of this loose rock is "tracked" on out to the ramp area. This is due to the large number of vehicles utilizing these access roads which are surfaced with this loose, crushed rock. Many of these vehicles operate in close vicinity of our expensive jet aircraft. No amount of sweeping (NAS Whidbey has one of the new long-nosed vacuum sweepers in use) will prevent a jet from picking up a rock that has just been "tracked" out on the operating ramp by a refueler, utility vehicle, or any one of the others that constantly ply back and forth.

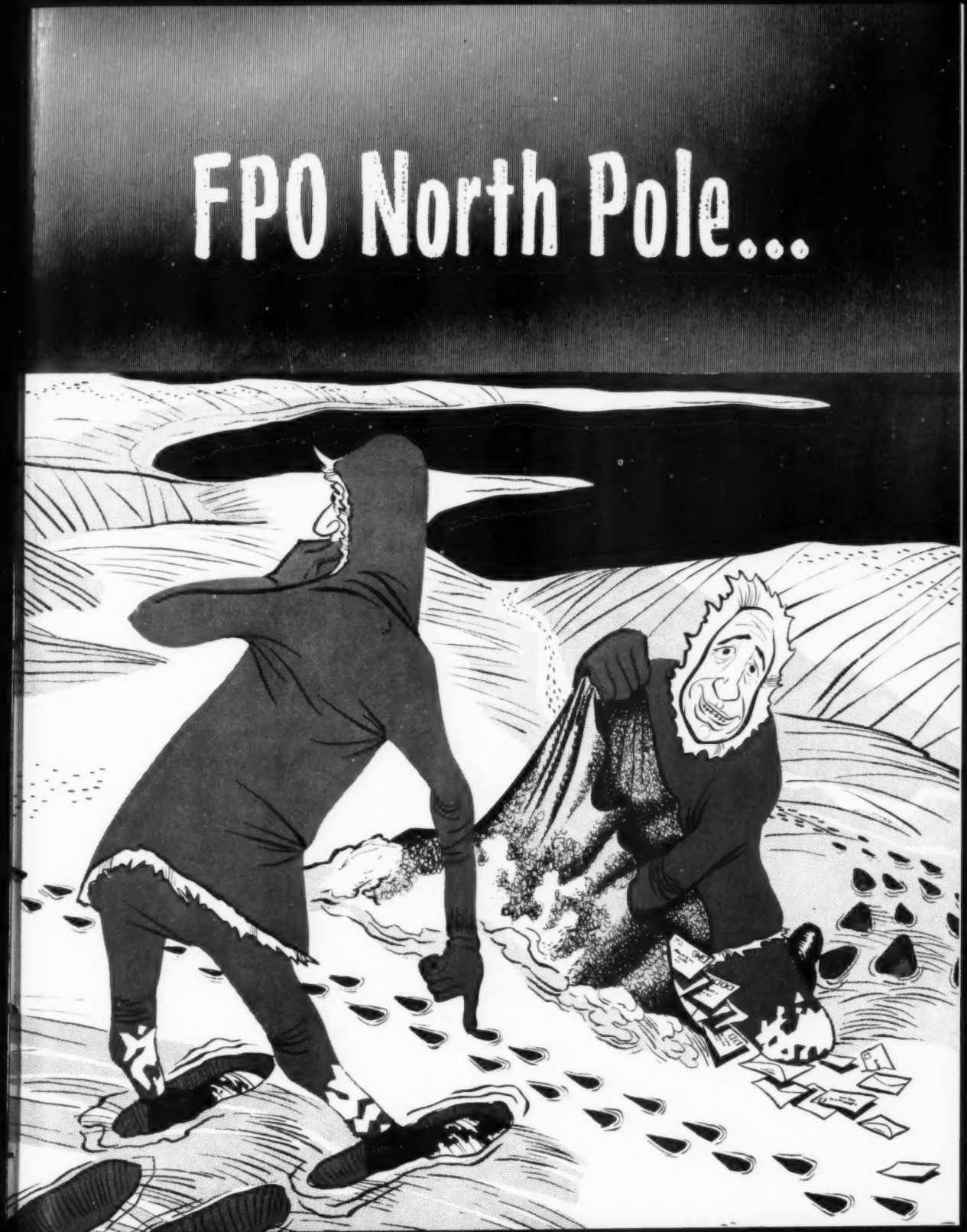
I would suggest the following procedures to prevent this tracking:

1. Make certain that access ramps and roads be kept clean of loose rock, etc., and re-surfacing procedures be such that a smooth, clean surface be left instead of being covered with loose, crushed rock.

2. The tires of all refuelers and other vehicles which are required to travel on the ramp be equipped with tread that does not pick up small rocks to be dropped in the operating area. (This is particularly noticeable on the refuelers.)

W. P. MOORE, AC2

Air Traffic Control Office
NAS Whidbey Island


FPO North Pole...

ONE frosty sub-sub-zero day when one of our atomic submarines was touring the Arctic and north polar regions, several courageous souls were given the additional duty of sounding the ice.

Walking about one of the nearby floes with his electronic ice sounder, a sailor named Joe suddenly stopped short as he stubbed his toe on a strange object. Peering thru the grey light of the Arctic winter day he saw a worn leather bag half-buried in drifted snow, and he swears that leading to and from it were diminutive footprints that could only have been made by a two-footed creature wearing pointed-toed shoes!

When Joe shouted his discovery to his companion, Eddie, the poor fellow didn't know whether to run like mad for the medic aboard the sub or to come closer and take a look at Joe's discovery. As he related to his skipper later, "Frankly, sir, I was almost afraid to look for fear I'd see the same thing he had. I'm telling you, that North Pole climate plays strange tricks on you, and for all I knew this was the first symptom of snow blindness!"

It was no illusion, however, and the two submariners after a little digging and jiggling got the bag out of its frozen hiding place. Then on the double they raced with it back to their ship to examine it under a steadier beam than the blue and yellow flickering of the Northern Lights.

"It's probably an historic message from some ancient explorer!" breathed Eddie, whose last name was Ericson and who maintains that Leif Ericson and not Chris Columbus discovered our own native land.

"More likely dropped by some Russians trying to set up a polar launching pad," snarled Joe who reads spy stories in his bunk during off-duty hours.

"It's the darnedest thing," muttered the skipper, who was a veteran of four Med cruises and had four bambinos at home. "This bag has a familiar look. It seems to me I've seen pictures of it before, and I can't help thinking it was in a book my kids have. Now what the holy herring could it be?"

He closed his eyes and concentrated as though he had a carrier sighted thru his periscope, and suddenly a look of shock came over his face only equaled by the frogman who accidentally grabbed hold of the electric eel. "Great Duplicate Dolphins! It was that rhyme by Clement Moore—you know, men, the one that goes 'Twas the night before Christmas and all thru—' . . . "

Poor Eddie! It was almost more than he could stand. Had the skipper gone crazy, too? Footprints no bigger than your thumb—and now this! He edged toward the nearest ladder and started to run toward sick bay, but Joe stopped him.

"It's true!" he shouted. "That's what it looks like—Santa's bag! A bit worn, maybe; a little stiff from the weather, but that's what it looks like to me, too!"

The skipper could wait no longer, and in a frenzy he pulled open the big brown bag. Out on the deck poured letters—letters—letters like Perry Como's request time! All of them were addressed the same, with a few simple variations: "To Mr. S. Claus, North Pole." Shuffling thru them rapidly, the skipper noticed a strange thing; all the return addresses were Navy duty stations—Fleet Post Offices, Naval Air Stations, carriers, and even a few Washington addresses.

Then from the midst of this amazing collection Joe pulled a faded red sheet, with typing in white, that apparently had been at the top of the stack when the bag was closed. It read:

ELF SQUADRON ONE
Fleet Post Office
North Pole

From: ComELFRon ONE
To: APPROACH Editors
Subj: Letters, forwarding of; request for
Encl: (1) 9,342 letters, assorted, in elfabetical order

1. This letter is submitted, with 9,342 enclosures, to the editors of APPROACH for action.
2. The 9,342 letters, enclosure (1), were forwarded to this command by BuClaus for action and compliance in accordance with standard past practice. Due to problems of reorganization and insufficient time for proper evaluation (including determination of "elf life") the requests contained in enclosure (1) cannot be met by this command.
3. This command is capable of answering requests for toy trains, planes, dolls, balls, hats, bats, trucks, ducks, kittens and mittens, but is unable to locate a suitable approved vendor for such items as a "solid flight plan with realistic outs," or "an unobstructed guard channel."
4. Since APPROACH magazine has been widely known in the past to make such recommendations, enclosure (1) is hereby bucked to the editors for action and/or disposition as deemed appropriate.
5. It is requested that this command (Code 1959) be kept informed of the progress, or lack thereof, in this matter, by weekly reports in ninetuplicate, with an info copy to Chief, BuClaus.

FOR THE COMMANDER
Leading Elf

And so it was that APPROACH came into possession of a group of most revealing letters. Of

course, we couldn't violate a confidence by publishing them here—after all, they were written to a Very Senior Gent. But from them we have created, for you, a ready-made Christmas shopping list to end all Christmas shopping lists with a few added items of our own—see our Enclosure (1)!

Most of the items are "obtainable locally," but some require a good bit of imagination and determination to produce. You can do it, though, we know you can.

Happy shopping, Merry Christmas, Happy New Year!

approach

THE NAVAL AVIATION SAFETY REVIEW
U.S. NAVAL AVIATION SAFETY CENTER
N.A.S. NORFOLK 11, VIRGINIA
TELEPHONE - MAdison 2-8211, Ext. 3641

NASC/33a/pmw
Ser: 1959
2 DEC 1959

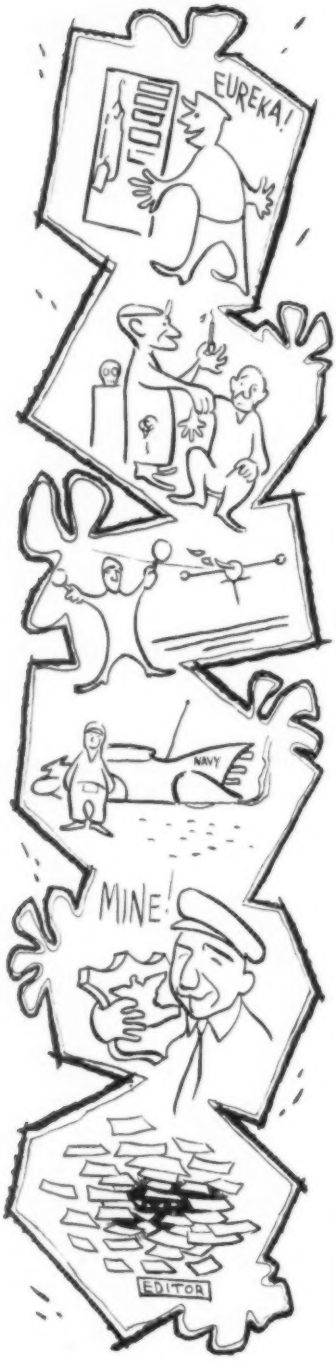
From: The Editors
To: Readers Everywhere
Via: December 1959 APPROACH
Subj: List, Christmas Shopping; forwarding of
Ref: (a) ComElfRon ONE undated unserialized ltr found in sack at 89°59'59"N, 179°59'59"W
Encl: (1) List, Christmas Shopping, MK-I, Mod. 1959

1. The many enclosures to reference (a) have been screened, scrutinized, sifted, sorted, synthesized and summarized and now appear as enclosure (1).

2. Enclosure (1) is suitable for use in all regions and climates, at sea and ashore, and may be freely modified to suit local requirements.

The Editors

See Enclosure (1) next page



Christmas Shopping List

Safety and survival officer—clean, untorn, properly inspected, stowed, and marked life vests.

Flight surgeon—everyone with sniffles at sick call before the sniffles become pneumonia.

Air boss—arrival at the ramp at Charlie time.

Flight crew—better and more varied flight rations.

Line chief—yellow sheets with complete and accurate description of aircraft gripes.

Commissary chief—submission of ration requests more than 10 minutes before takeoff time.

LSO—roger passes.

Vehicle drivers—automatic transmissions.

CAP pilots—100% tallyhos.

CIC controllers—100% bogey splashes.

Aviation safety officer—the CNO Safety Award, of course!

APPROACH editor—a flood of stories, articles, tales, photos, sketches, letters, cartoons, Murphys.

Plane pushers—Piper Cubs.

Baggage handlers—muscles.

Transient pilots—JP-5 in the truck marked "JP-5."

GCA controllers—standard rates of turn and descent.

Admin. yeoman—early receipt of APPROACH every month.

Air Force—tailhooks.

Supply people—just one chit that isn't URGENT.

Hospitalmen—a rolled up sleeve.

Messcooks and compartment cleaners—rotation.

Beach crew—Key West.

Dental corps—more patience, fewer patients and big WELL DONE.

PIO—the CNO Safety Award, of course!

Proficiency pilots—proficiency.

Operational pilots—proficiency.

Army—close air support—right now and right on.

Squadron maintenance officer—a flight schedule which takes into consideration the requirements for quality type maintenance.

Squadron operations officer—a maintenance check schedule which takes into consideration the requirements for quality operations.

Ops duty officer — sound, solid flight plans, with realistic outs.

AC in the tower — only one receiver shouting at a time.

Duty SAR crew — unobstructed guard channel.

Crash crew—drills and false alarms, and not a crash in a carload.

Squadron CO—the CNO Safety Award, of course!

Plane captain—nary a squawk, nary a gripe, just fill 'er up and wipe the windshield.

Carrier skipper — wind, sea room and smooth, on-time recoveries.

Chaplain—a full chapel.

Jet mechs—a full set of tools, neatly stowed in the tool box and not in the compressor section.

Recip mechs—a full year of 3350 starts without backfires.

Techs—gear that works as well in the air as it does on the deck.

Ocean station vessels—thanks—just for being there.

Wing walkers—roller skates.

Parachute rigger—a BACSEB.

Flight gear issue shack—plenty of everything, and no complaints from anyone.

Flight gear officer—no complaints from the guys in the FGI shack.

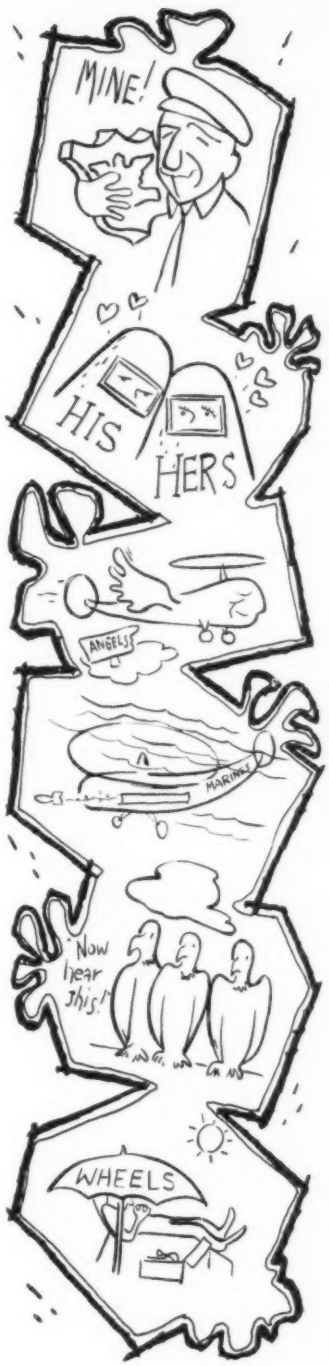
Guys in the AI office—a new, bigger safe in which to lock up their New York Times and Herald Tribunes.

Ordnancemen—a new coffee pot.

Man in the Center—an IFR flight plan with "any available altitude" requested.

SDO—no duty on weekdays, weekends, holidays, and squadron parties.

Flight deck integrity watch—flight deck integrity.



Electron chasers—a whole week of no buddies with broken TV sets.

Leading chief—time out from signing dungaree chow chits to lead.

Wingman—a leader who is a leader.

Aircraft designers—a plane which, when delivered, isn't expected to do more than the specs called for.

All pilots, less helo and P-boat—gear down and locked on all approaches.

Copilots—a pilot who lets you actually make the landing that he credits you with.

All P-boat pilots—swells with the wind.

Hot papa—a hot mama.

BuShips—a patent for an anti-burble device, retrofittable on all carriers for $3.75.

Helo rescue crew—admission to the "reserved for angels" section in heaven.

Duty meteorologist — a new "Farmer's Almanac."

The Marines—an armored, submersible helicopter w/bazooka.

The vultures in vultures row—running commentary from the LSO.

Hangar deck officer — assignment as flight deck officer.

Flight deck officer — assignment as hangar deck officer.

Night check crew—all checks completed by the day gang.

Exec—fleet-up orders.

Legal officer—an ensign assistant fresh out of Harvard Law School.

Runway wheels watch — an umbrella, beach chair, and a record of "All Alone."

Everyone on the line—a pat on the back for each time you bend over to pick up a foreign object.

Log yeoman—neat, clear legible yellow sheets, all year.

Flight officer — a new flight schedule form, with space for changes 1 through 10 and a blank area for the actual schedule flown.

The training command—a trainload of keen, alert, eager youngsters with open minds and a fervent desire to fly with the Navy.

Blimp pilots—a BIG red rotating beacon.

P-boat pilots — ramp-to-ramp credit for flight time.

DOWN YOU GO

. . . but how you go down depends on how you fly your airplane. "A good approach more closely insures a good landing." These words on the subject from the ComNavAirPac Safety Bulletin, while not new, are well worth reading and heeding. If you want to make your flying more precise . . . . .

LANDINGS are the most difficult of all flight maneuvers to perform. The proportionate number of aircraft accidents that occur during this phase of flight certainly supports such a statement. It would appear that pilots are not treating the landing as the precise maneuver that it is since most of the accidents result from poor airspeed and rate of descent control.

Being a precision maneuver, landings require an understanding and use of flight fundamentals. Two of the most important to landing are using the stick to control airspeed and the throttle to control rate of descent. This latter statement should not sound strange to your ears as your flight instructor said it again and again, and your instrument instructor was rabid on the subject. In the next few paragraphs we hope to not only refresh your memory but thoroughly convince you of this technique.

To reduce the arguments in this discussion we acknowledge that for precise control of aircraft, power and angle of attack are interdependent. However, the point to be proved is the stick is the *primary* control for airspeed and throttle (power) is the *primary* control for rate of descent.

First, let's consider the situation of a pilot making a cruise descent at a constant airspeed or mach number. He reduces power to a given value and starts down. Now what technique does he use in maintaining the desired airspeed? If the airspeed is slower than desired he pushes forward on the stick (reducing the angle of attack) until the proper airspeed is reached. If fast, he pulls back on the stick.

What causes the airspeed to vary with changes in angle of attack? Basically it's the change in drag that produces the change in airspeed. In moving the stick we changed angle of attack and thus induced drag. By pushing forward on the stick we decreased the induced drag and since the power or thrust was not changed, the thrust temporarily exceeds the drag. Due to this unbalance the airspeed increases until the total drag again equals the thrust where the airspeed stabilizes. The reverse is true when we pull back on the stick (increase angle of attack). This time the drag momentarily exceeds the thrust so the airspeed decreases until we again reach a balanced condition. The stick was used to control the airspeed.

The argument is raised that if power is added or reduced, airspeed will increase or decrease correspondingly. Such is true, but the airspeed changes are a result of the power changes and you take what you get, not control or select it.

Now to the point of using throttle (power) as the primary means of controlling rate of descent. This time assume we are making an approach in landing configuration at a constant angle of attack, airspeed and rate of descent. In the approach we determine we are going to land a little short of our intended touchdown point and the question becomes what action should we take to prevent it. Let's look at the formula by which we compute rate of descent to see what factors are involved.

$$\text{Rate of descent} = 101 \text{ Velocity (knots)} \frac{\text{(Thrust—Drag)}}{\text{Weight}}$$

From this formula you will note the pilot can vary velocity by using the stick, thrust by changing the throttle and drag by changing the angle of attack (stick). We don't want to change airspeed because it's at the optimum. Our angle of attack is at the correct index which we don't want to change, and also any change in angle of attack will change our airspeed. That leaves us with thrust (power) to vary. Adding power will reduce the difference between the thrust and drag and thus decrease our rate of descent. Our glide angle flattens and the undershoot condition is corrected.

The flatter glide does decrease the angle of attack and thus the drag so the airspeed will increase proportionately to the amount of power added. However, a proportionate increase in angle of attack will return the airspeed to the previous value.

You may take issue with the above propositions because you feel the airplane doesn't react that way. What has been said applies to a steady state condition, i.e., the airplane will take a few seconds to react in the manner described. The reaction of the airplane between the time a control is moved until a steady state is reached is referred to as a transient condition.

An example of such is when you pull back on the stick without adding power trying to flatten or stretch your glide. Momentarily the rate of descent is reduced because the lift increases right along with the increase in angle of attack. This airspeed drops off accompanied by an increase in rate of descent which remains. This is the steady state condition.

You have probably noticed in the above discussion that in attempting to precisely control the aircraft a change in one necessitated a change in the other. This we acknowledged at the beginning. However, the stick is the *primary* control for airspeed (angle of attack) and the throttle (power) is the *primary* control for rate of descent. Use them as such and your flying will be more precise.

FORGING

IT IS fundamental that most major accidents occur as a result of a combination of errors. A pilot can get away with some errors but when he makes enough to complete the links of the chain the yeomen can take the covers off their typewriters and standby for the accident board to convene. Some of the links are beyond the control of the pilot. These fall into the broad categories of pilot experience, design characteristics of the aircraft, material failures and unusual weather or field features. Other links are within the control of the pilot. These include pilot technique and knowledge, adherence to standard operating procedures and full utilization of safety equipment. The account that follows is an example of how the links were forged to lead to a major accident.

The accident involving the loss of a *Neptune* P2V aircraft, Delta type injuries to two pilots and extensive damage to GCA equipment illustrates the completion of the chain and the results.

The Scene. The P2V-7 took off from an East Coast NAS on a surveillance flight. The flight was planned for 6 hours and the fuel on board was listed on the DD-175 as 10 hours. The weather was forecast to be VFR at the time of landing. The pilot had a total of 1990 hours and 1498 in P2V model aircraft. He enjoyed a reputation as one of the best younger pilots in his squadron and had had no record of aircraft accidents.

First Link. Fuel on board as listed by pilot was 10 hours. Actual fuel on board 12.5 hours. This discrepancy later became significant in terms of landing weight.

Second Link. The port engine was feathered because of severe back firing after the flight had been out 2 hours and 6 minutes and at this time both jets were started and the pilot proceeded to home plate on three engines.

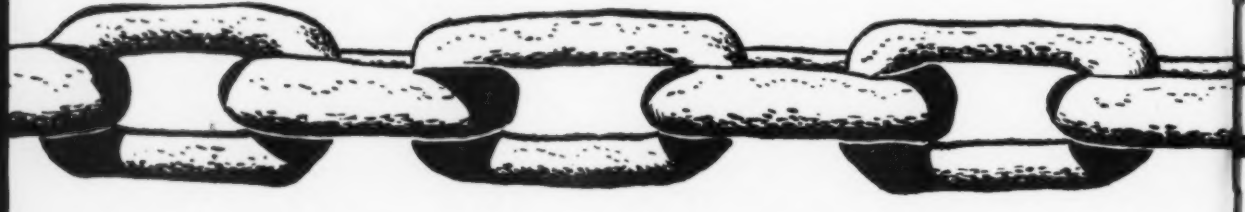
Third Link. Over the field the pilot reported fuel load as 900 gallons. This was close but subsequent examination revealed that the aircraft had 436 gallons in port outer main and 79 in the port center section. In the starboard outer main there was 150 gallons and in the starboard center section 70 gallons. The difference was 295 gallons or 1770 pounds, mostly in the port outboards. The starboard main gage read 100 gallons high.

Fourth Link. The reported weather at home place was 800 broken and 6 miles visibility instead of the VFR that had been forecast.

Fifth Link. While on glide path and IFR, the pilot lowered the wing flaps from 10 to 20 degrees. This caused aircraft to balloon 50 feet high on the glide path. Squadron doctrine called for 20-degree flaps to be lowered on the cross leg. The 50 feet high position on the glide path was maintained until the aircraft was ½ mile from the runway.

Sixth Link. At an altitude of 600 feet on the glide path the jets were secured and full flaps were lowered when the pilot broke contact. This reduced a three-engine condition to a one-engine condition. The pilot was committed to land on this approach, inasmuch as the aircraft weight at this time was 58,000 pounds. A single-engine waveoff cannot be made at this weight from the runway and, if it could, directional control is marginal with asymetrical loading.

Seventh Link. Initial touchdown was made nose-wheel first 1300 feet down the runway after the pilot dove for the deck, flared and floated down the runway.



THE CHAIN

The aircraft porpoised approximately 5 feet in the air and made a second contact, nose-wheel-first, 1200 feet further down the runway. After the first touchdown, the pilot released the yoke and allowed it to fall free when he still retained some elevator control.

Eighth Link. After the second contact the aircraft again porpoised and became airborne and the pilot ran the starboard engine to 40 inches MAP and 2600 rpm and called for jets (previously secured at 600 feet while on glide path).

Final Link. No hardhats were worn by the pilots and Class Delta injuries to the pilot and copilot were caused by flying glass. This could have been averted by the use of hardhats. Subsequent investigation revealed that other crew members had unnecessarily jeopardized themselves by not using their seat tie-down cables, head rests or seat belts.

Results. The aircraft swerved to the left after the application of power and landed nose-wheel-first and left-wing-down. The nose wheel collapsed at this time. The aircraft departed from the runway at a 20-degree angle and skidded uncontrollably into a GCA truck parked on its hardstand. Scratch one *Neptune* plus one GCA truck and most of its equipment.

Discussion. From the time this aircraft came over the fence fast to the time the pilot used 40 inches of MAP in his momentary effort to take a waveoff, the pilot rushed his landing. When the P2V-7 is landed fast and flat the conditions are right for a porpoise. When this happens the pilot gets behind on his elevators and the main gear acts as a giant spring that will increase the severity of the porpoise. Once started, the porpoise can best be stopped by taking a waveoff. The pilot had denied himself this way out when he intentionally secured his jets.

At 58,000 pounds the P2V-7 can be stopped in a no-wind condition without use of REVERSE in slightly more than 2000 feet at sea level. The runway in use was 8000 feet long. In addition, the pilot had 6 knots of wind to aid him in stopping the aircraft. The effect of idling jets that are secured after the aircraft is on the runway does not add a significant distance to that required to stop the aircraft with no jets.

There is the complete chain.

There is an accident.

The weather gradually deteriorated with haze and rain. The valley seemed to take a sharp rise and looked almost like a dead end. For two AD-5Ns it was . . .

PITIFUL PARALLEL—Two 2-plane sections took off from the ship on separate low level strike missions. One-half of each section returned. The other half of each section stayed on mountain slopes about 30 miles apart.

Each section was composed of an AD-5N and an AD-6. In each case it was the AD-6 that made it back and the AD-5N that didn't.

The first section took off at 0608 and proceeded at low altitude toward the coast. The pilots split up when their landfall was reached and went toward their separate targets inland.

The AD-6 pilot spotted a cloud layer along the mountain tops and climbed on top to about 6000 feet. He reached his target and made one attempt to let down through a thin spot to a low of 1000 feet. The nearest marked elevation was 614 feet. No break appeared between cloud bottoms and mountain tops. "I had a slight twinge of vertigo and got scared and climbed out of there." He got back and so did his airplane.

The AD-5N pilot elected to stay contact with the surface all the way and remain under the weather. As he crossed the coastline he found a valley which he figured would get him through the mountains. The weather looked all right though some of the mountain tops were shrouded in clouds. Visual flight was continued for about 10 minutes following the contours of the valley. The weather gradually deteriorated with haze and rain. The valley seemed to take a sharp rise and looked almost like a dead end. A rise appeared directly ahead and there was not enough room to turn. An emergency climb was made and the external tanks were jettisoned. The plane struck the mountain slope about 200 or 300 feet from the top. The time, 1020. The attitude at impact was flat and the airspeed was about 95 knots. None of the three on board were injured but the plane began to burn immediately. The pilot and rear seat crewman escaped without difficulty but the right seat crewman was burned when he was delayed in unhooking his raft lanyard. They all made it back but without one aircraft.

The other section was launched at 0610 and headed for the same coast on a similar mission. The rendezvous was never made so the two aircraft proceeded independently for the entire flight.

The AD-6 remained on top of the weather but encountered frontal conditions and icing. Over land he had a solid overcast beneath him and could see moun-

tain crags jutting through the clouds. Attempts to get underneath were unsuccessful. The pilot soon ran into weather he couldn't top. "As I went IFR again, it convinced me I was through for the day. I returned to the ship." He got back and so did his airplane.

This AD-5N pilot, like the other, attempted to remain visual below the clouds. The statements of witnesses very near the site tell the story.

"I first heard the plane approaching from the ocean at a low altitude. The visibility was near zero and the wind was about 35 knots. The plane passed overhead, circled to the left and again came low overhead, struck the ground and exploded."

"There had been no reason to make me believe the aircraft was in trouble, unless he was lost in the fog. The visibility was about 32 feet."

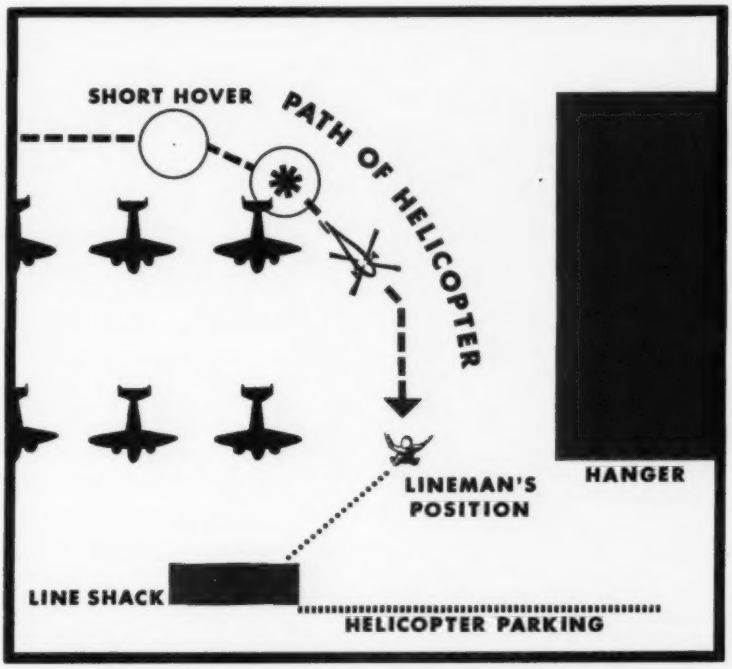
These witnesses were hunting along a mountain ridge at an elevation of about 2200 feet. The plane struck the back side of the slope near the summit and disintegrated. The time, 0921, 59 minutes before and only 30 miles away from the other accident. The difference—three fatalities.

These accidents were entirely unrelated even though the missions and briefings were the same and both were collisions with the ground. But the accidents must be considered together and in relation to each other due to the identical preliminary facts and the involvement of two pilots attached to the same squadron detachment. The occurrences were investigated by separate AAR boards but the findings of each and even the endorsements were very nearly identical.

The weather briefings given to both pilots were sufficient to let them know that it would be touch and go all the way and that they should not be at all surprised if the mission had to be aborted.

Comments in the AAR's and endorsements indicate that the pilots were briefed that the flight was to be made VFR; that they proceeded at altitudes below the minimums given in the briefing; that a sinuous course was flown in an attempt to follow the valley contours and that this attempt continued at about 400 feet over unfamiliar terrain until actual instrument conditions and disorientation were encountered.

The parallel narratives continued to the very end; two major accidents arising out of the same circumstances and from the same cause. "... the primary cause of both was . . . pushing the completion of their missions too far in poor weather, at low altitudes over mountainous terrain . . ."



DOWN WASH—An HSS-1 approached the air station for landing and was cleared to touchdown between a hangar and parking area. At between 20 to 30 feet, the pilot flew toward the hangar, well clear of the parking area, and hovered while awaiting a plane director to spot the landing area.

Upon seeing a plane director the pilot began moving forward again and though he believed his course to be clear, the helo's flight path had altered to the right in what amounted to a shortcut across the edge of the parking area. "I was busy watching the taximan and keeping my eye on the power required to air-taxi in this no-wind area," said the pilot.

The HSS passed close to the last SNB on the line and rotor wash hit the tail. At the time the aircraft was chocked, tied down with control locks in position. Damage amounted to a buckled elevator assembly and one cracked elevator hinge.

CHANGE OF POLICY — Ever since the helicopter became operational it has been subjected to an amazing variety of work—anything a horse can do, and more. Consequently when a jeep became stuck in the mud at a far northern station, a request to pull it out by helicopter was not considered too much of a novelty.

The HO4S tooled out to the stranded jeep and prepared to make the rescue with a cargo sling. When all was ready the "horse" took up the slack and under the whip of throttle and cyclic it strained forward.

The job didn't go well however. As pull was absorbed by the forward two cables of the sling, the helicopter had a tendency to tuck. More pulling and tucking followed until the pilots suddenly realized if more altitude were lost they would be stuck in the mud along with the jeep.

Quicker than you can say "aircraft accident report" the decision was made and acted on. The cable was released but it was done an instant too late. During the release maneuver the forward struts made contact with the ground hard enough to cause them to need replacement.

The reporting custodian apparently felt this type of work could better be left to the hay burner model horse. For "corrective action taken" he wrote "discontinued all towing of vehicles."

HANG UP—An hour after being launched the pilot of an F11F felt a loud "thunk," aft and down from the cockpit. A wingman checked the troubled aircraft and reported no visual damage. It was not until the pilot attempted to throttle back that trouble was found. The throttle could not be moved below 93 percent.

There was a zero reading on the pneumatic system gage and technical information from the carrier led to a diagnosis of an explosion in the moisture separator. This offered no help in getting the aircraft back to earth however.

"An evaluation of the situation was made," said the pilot, "and I decided that I could safely make an approach and land. With gear and flaps down, the speed brake override switch allowed the use of speed brakes and the afterburner nozzle switch was used for limited power control."

Both jets steered for a diversion airfield in the area which could handle jets. No radio contact could be made on the three published frequencies and the carrier relayed information that the main runway was closed for repairs. With this additional unforeseen difficulty it was decided the wingman would land first on an available taxiway parallel to the runway, make whatever arrangements possible and relay information to the pilot of the distressed F11F.

"I landed on the taxiway," said the wingman, "and after an exchange of notes with personnel at the field, told the other pilot he could land on the runway, that no arresting gear was available, that there was a crosswind from the left and that crash equipment was available."

When the distressed F11F started down, RPM rose 96 percent and the throttle still could not be moved. "I set up a wide pattern," said the pilot, "2500 feet downwind at 160 knots, and a long straightaway on final with 150 knots. Just prior to touchdown the speed brakes were raised."

Skimming over the end of the runway, the tires screeched on hard surface 100 feet from the threshold at 135 knots, afterburner nozzle open. Immediately on touchdown the fuel master switch was turned OFF.

It was soon apparent that the fuel master switch was not going to work. With only 3000 feet of runway remaining the speed was still 120 knots and the engine continued to turn at high RPM. Gentle braking was tried and the speed dropped to 105 knots. One tire blew but now the end of the runway and rough overrun was visible and the pilot bore down hard on the brake pedals. He succeeded in slowing only slightly before the bitter end of the runway flashed past. The aircraft jolted 900 feet to a stop, during which time the starboard gear sheared and the left was severely damaged.

"I abandoned the aircraft," he said, "and awaited the arrival of the crash crew. After the dust had settled, I could see the engine was still running (at 96 percent) and there was no danger of explosion, so I held the crash crew off and waited until the engine flamed out from fuel exhaustion. This took about five minutes."

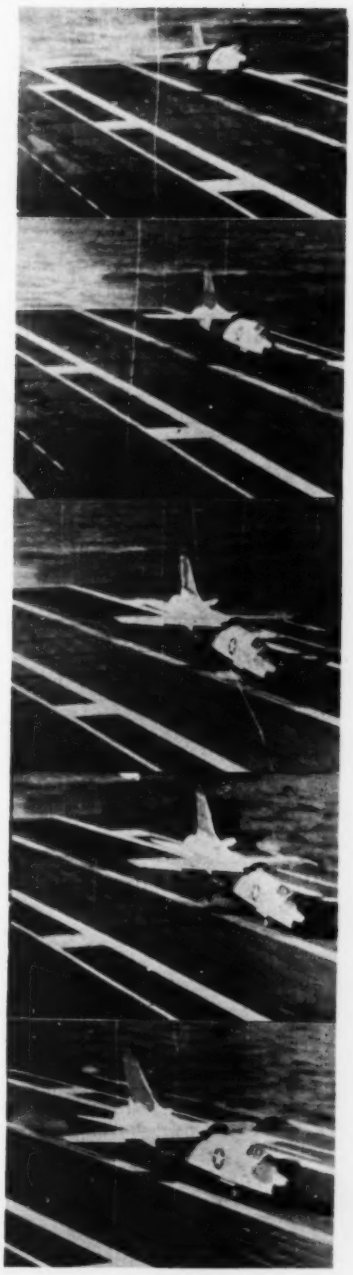
An explosion of the pneumatic system moisture separator was confirmed and it was found that the actuating motor of the main fuel shut-off valve assembly was torn away plus a section of the teliflex cable conduit of the throttle was crimped, explaining the locked throttle.

The accident board noted that the pilot's actions in handling the precarious situation were sound and thorough and they recommended that pilots flying the F11F-1 be rebriefed on the technique involved in making an approach and landing under conditions of a jammed throttle at high engine RPM.

Thought for the Month

BEFORE EVERYTHING ELSE FAILS READ THE INSTRUCTIONS

LOW BLOW

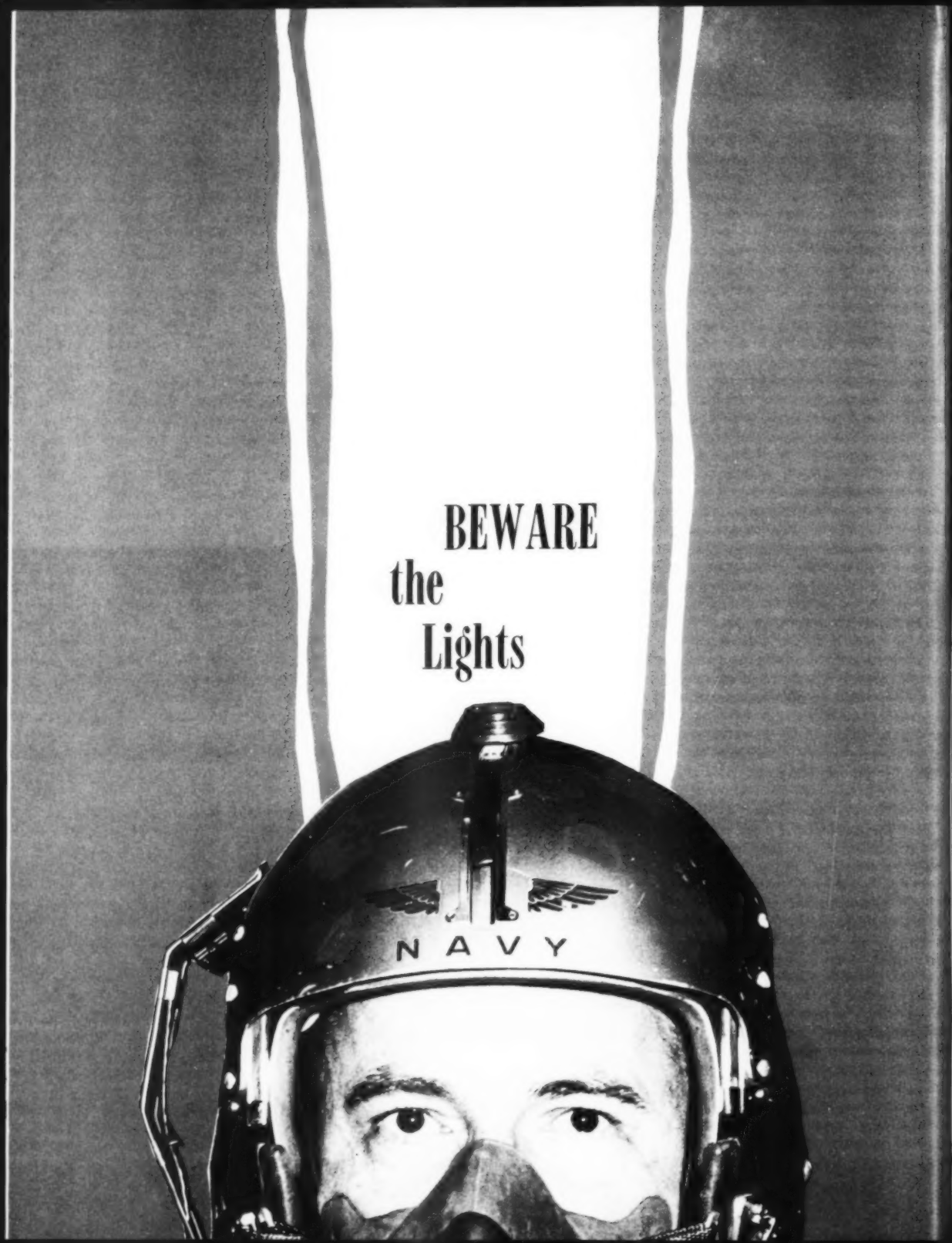


The Waveoff Resulted in Overrotation

DURING the final part of the approach, the F8U dropped below the glide slope in a manner described by the LSO as a "high dip." Simultaneously, the LSO keyed the waveoff lights and transmitted "Waveoff, waveoff!"

The pilot advanced the throttle to MILITARY POWER and abruptly increased the nose-high attitude in executing the waveoff. The excessive rotation literally slammed the aft section of the fuselage and hook into the ramp.

Following initial impact, the airplane bounced up onto the flight deck with a rapid nose-down rotation and as it continued up the flight deck, missing all wires, it porpoised wildly and became airborne well before reaching the end of the angled deck. Upon being "bingoed" to shore the pilot executed a normal field landing upon arrival.


BEWARE
the
Lights
NAVY

A pilot who balances

himself on a light with everything else black, doesn't know which way is up.

VERTIGO or DISORIENTATION needs to be experienced to be appreciated. By appreciated, we mean having a healthy respect for it. Have you ever been on the gages with no horizon and felt an overpowering urge to pick up a wing, or push the nose forward, or roll it the other way? Brother, if you have, you have experienced vertigo.

In looking over the last six accidents involving disorientation, we find two common denominators. The first is INEXPERIENCE. In each case the pilot was sent out on a mission he was not qualified to perform by virtue of his lack of recent instrument flying. This does not mean that only inexperienced pilots get disoriented. It simply means that these pilots were unable to cope with disorientation, because the ones who got back experienced disorientation also. The second common denominator is LIGHTS.

It would take a few thousand words to describe the various conditions of flight that are conducive to vertigo so we'll settle for the worst condition. A pilot is in the clear at night above an overcast and is about to make a letdown to a ship. He is flying VFR and glances occasionally at the gages for a cross check. He starts a long, gentle descent and after a few minutes enters the top of the overcast. There is no longer an outside reference to balance himself and the transition is slow. He breaks through the overcast and finds himself in a black void with no horizon. He peers out of the cockpit in the hopes that he will see a light. He doesn't, so he goes back on the gages. Anxiety is creeping up, but everything is under control—so far. He makes a turn or two, but can't feel the airplane turning. He knows he is turning because the horizon bar tips and the compass starts moving slowly. He looks outside again for a light and this time he sees it. A light means safety. The light is his friend. At this point the pilot gets vertigo. In this black void the pilot gets the feeling that the light is above him, yet common sense tells him the light is below. He looks back at his instruments and he is in a turn. He knows he is not in a turn because he can't feel it. From then on confusion reigns and only those pilots who, through experience, have disciplined themselves to believe their instruments can survive.

Whenever a pilot tries to balance himself on a light with everything else black, he doesn't know which way is up. This is especially true if the light is moving, possibly on another aircraft in the same black void. He doesn't have to look at a moving light, just see it out of the corner of his eye and he gets disoriented. Pilots flying formation in the clouds are staring at lights of the aircraft they are flying on and are usually completely disoriented. If they should get separated from those lights, they are in real trouble. The transition to instruments is most difficult. The inexperienced pilot will most likely roll the airplane violently one way or other to get out of that turn they are in even though the horizon bar shows level flight. Below 1500 feet in a jet, this does not afford much time to recover the balance. Letting down over land at night with thousands of bright lights and making a turn over water with no lights and no horizon is not bad unless the pilot cocks his head to the outside of the turn. He then gets the feeling he is turning the other way and is disoriented.

Here are some DON'Ts that should be adopted as SOP for night flying:

DON'T send a pilot out who is inexperienced or lacks recent experience if recovery is expected with no horizon and an overcast.

DON'T take the eyes off the gages once a penetration starts, especially to look at lights.

DON'T stare at lights. If you have to look at them, make it a fast glance and glue your eyes back on the horizon bar.

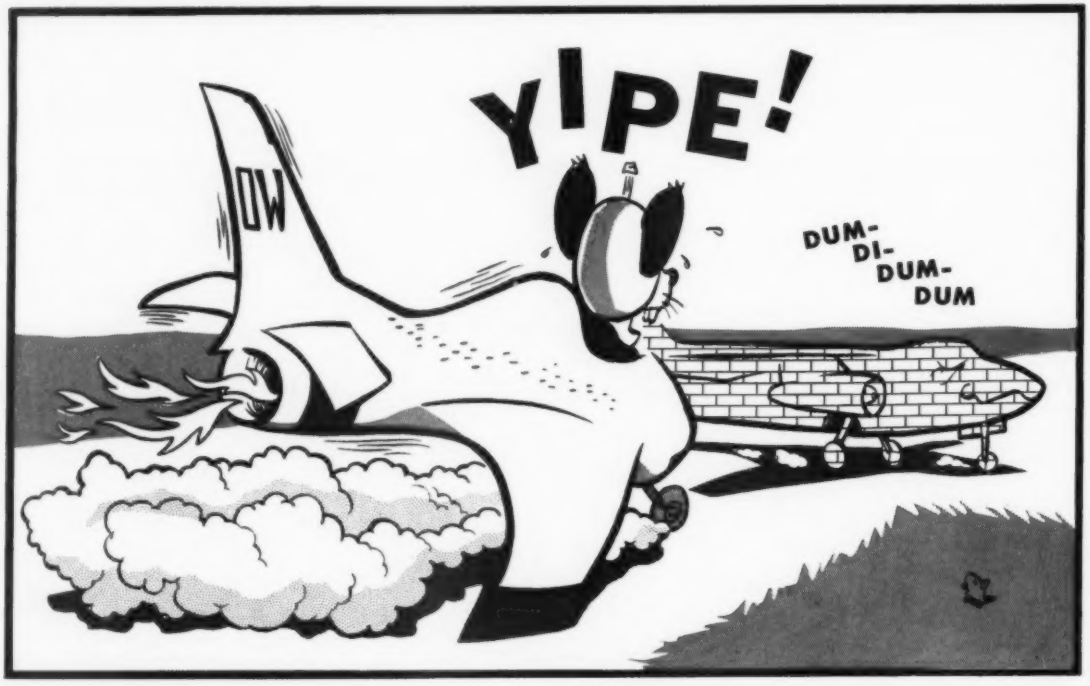
DON'T attempt to fly the gages and contact at the same time.

DON'T believe the seat of your pants, believe your instruments.

DON'T fight the feeling if you have the time and fuel to get back above the overcast where you can regain your equilibrium. The next approach is by a more experienced pilot.

DON'T ever think it can't happen to you. All your night flights may have been with a horizon.

DON'T forget. BEWARE OF LIGHTS on black nights with no horizon.—*ComNavAirPac Safety Bulletin*



Drag Race

ON RETURNING from a weapons training flight as leader of a flight of three FJ-4Bs, I was advised by an alert tower operator that I would be cleared to break over the numbers. I rogered and broke shortly past the numbers. As I approached the 180, I was further advised by the tower that I was cleared to land, number two behind an A3D turning base.

Maintaining a good interval on the A3D, I followed him through a deep 90 and long straightaway which was necessary in order to keep clear of F3Hs conducting MLP on the left dual runway. The A3D touched down on centerline, near the threshold, and deployed his drag chute. Seeing this, I slowed down a bit more and touched down just over the threshold at minimum safe landing airspeed.

I began aerodynamic braking,

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. As the name indicates these reports need not be signed. Forms for writing Anymouse Reports and mailing envelopes are available in ready-rooms and line shacks. All reports are considered for appropriate action.

— REPORT AN INCIDENT, PREVENT AN ACCIDENT —

eased the nose on at about 90 knots, and pulled up the flaps to increase my braking friction if it became necessary. About this time the plane captain's head appeared out the top of the A3D. Shortly thereafter the A3D eased over to the left side of the runway.

"Good headwork," I thought to myself. "He's leaving the right side of the runway clear for me in case I overtake him."

When I passed the 7000-foot marker on this 12,000-foot runway, I still had a fairly high closing rate on the A3D when lo, much to my surprise, I was presented with the broadside view of an A3D making a sharp right turn from the left side of the runway to leave the runway at the 6000-foot marker!

My thoughts went something like this: "What the ____'s happening. Good grief, he's turning off right in front of me. I can't possibly stop in time! I can't miss him, brake hard, head for his stern; maybe he'll get out of my way in time . . . Don't blow a tire though. I might make it yet. Yes I'll make it!

"Boy, this thing really slows when you ask it to. That dirty _____. I hope the sight of me bearing down on him gave him enough of a scare—if he ever saw me at all. The clod!"

By this time I was slowed enough to follow him off the runway at the same turnoff. There hadn't been a peep out of my (previously) alert tower operator.

I believe this occurred as a result of differential deceleration by different aircraft involving the use of a drag chute by one. A normal jet landing interval may not be sufficient in cases like this and tower personnel should keep alert when dissimilar aircraft are rolling out.

The tower could have easily cautioned the A3D on the circumstances and advised him to continue straight ahead or keep to the left side. Also, the A3D driver might have assured himself that the runway behind was clear before turning—his plane captain was posted and could have passed the word.

LEFTOVER DISH

AFTER landing an S2F at an Air Force Base, full left rudder was applied while turning off the runway. It jammed in this full throw position and refused to budge.

After removing the section of skin immediately below the port horizontal stabilizer, a loose clevis bolt was found jamming the bellcrank. This bolt apparently had been left adrift in the aircraft after having been replaced some time previously.

Its rusty condition indicated that the bolt had been floating around in the tail area for some time.

CONVERT

FOR carrier requalification I was to fly my FJ-4 to the CV from ashore, shoot one touch-and-go then as many trap landings as possible in the time allotted.

Following the touch-and-go, I noted my oil pressure fluctuating. This was obviously due to a broken electrical connection to the gage. As I continued downwind I thought to myself that I'd "keep my big mouth shut" and continue the landings. Another look at the bouncing needle modified my views. Maybe I'd better tell the ship about my problem and go home (50 miles away).

A few more glances at the needle changed my mind again. I've got a fine, floating-type airfield off my left wing. Best I get aboard it.

The arrested landing was uneventful except for the oil pressure gage reading ZERO. There was something broken all right—we poured 10 quarts of oil into the 16 quart system before finding the broken fitting that was expelling oil almost as fast as it was poured in. "Believe your gages, you've got nothing else."

WHO'S GOT IT?

ON AN instrument training flight in a TV-2, with the student under the hood, I took control to expedite leaving a congested area. While proceeding to an open area I discussed the merits of Tacan versus ADF with the student grunting "Roger" at appropriate intervals.

Upon reaching a clear area I said "you have it," the student

replied "Roger" and I *assumed* he had taken control. The flight path took on a "controlled" but somewhat erratic S-maneuver in a continuing left turn, with the needle on the rate of climb sliding between 1000 foot per minute up and down.

Eventually a nose-down, tightening circle developed and we were approaching limiting mach. Just prior to the red line the wings rolled level and the nose came through the horizon. At this moment I still *assumed* the student was in control and figured he was going to do a wing-over on the gages. However the nose continued to rise and we ended up in a vertical climb attitude with the airspeed falling off fast.

At 80 knots I began to have some doubts about what was going on and fed in right rudder to recover from the "maneuver." When I finally got the nose around to a more comfortable position and had the airspeed going back to where it was supposed to be, I asked the pilot in the back seat what his intentions had been and were going to be. He answered "I *assumed* you were demonstrating an unusual attitude and recovery."

All I can say now is that assumptions can be frightening! The next change of control for me will be acknowledged positively.

WORMY

AS WE climbed out from home field in a P2V, I noted a slow rate of climb. All instruments checked normal; engines putting out, IAS all right, nothing hanging in the breeze. On reaching cruise altitude and leveling off, the IAS was slow to build up and then increased suddenly. That should have been my first clue. Something was odd, but after fretting about it for several minutes, I convinced myself that all was well.

At destination a reported thunderstorm had moved from the field over to the range station so I canceled IFR and came around to land.

All was well approaching the 90, except that the airplane didn't seem to want to slow down. We were light so I sneaked off a little more power but the IAS stayed around 135. I rolled out on final in fine shape—400 feet, a mile or so out from the runway—still at 135 indicated. Suddenly there was the moaning sound of a P2V about to stall and we began a rapid mush toward the "too-close" ground.

I poured 46 inches to the engines and we just made the end of the runway, hitting not too hard, but still indicating 125 knots. When we stopped the needle on the airspeed was passing 55 knots and it dropped slowly down to ZERO.

Investigation of the pitot system revealed a nest of worms in the static line just inside the port vent. Although the vent on the other side was not plugged and it should have released the pressure, it did not, giving us a slow acceleration and deceleration on the airspeed.

Standard procedure on my flights now is to check the alternate system on climbout. These worms almost turned my whole day into a can of same.

Any Mouse?

An aviation hazard not often experienced (unless you've been keeping it a secret) has become somewhat prominent by being mentioned on several separate occasions recently. We refer to the presence of rodents in aircraft, and the potential danger to aircraft and crew from their habitation. A VR and a VP squadron recently reported evidence of unauthorized entry into aircraft by rodents, and in one case their appetite left some critical wiring exposed after they had made dessert of the insulation.

Commands having this problem in their aircraft need not requisition rat shields for their tie-downs, but should consult their medical officer who can give advice on how to do away with the pests. He'll probably ask how your housekeeping is—a P2V full of cookie crumbs and day-old peanut butter sandwiches is an added attraction to the hungry scavengers. Even if you're not concerned about the hazardous havoc the beasts can create, you should worry about the repercussions from carrying excess passengers—and without a parachute aboard for each occupant.

NIGHT DREAMING

YOU would think one near-miss for a wheels-up would be all a fella would need to teach him a lesson about trying to land the P2V without wheels. Unfortunately this is not the case.

Last night my plane captain got to the gear handle seconds before we would have dropped in. A waveoff was made and another normal approach (this time with gear down) was made. The near wheels-up was a product of the worst case of cockpit complacency I've ever had.

Things were going so smoothly and with such routine precision my mind had strayed to such problems as the lousy existence I'd be living during our forthcoming deployment. In late final I was wondering if my kids would remember me when I got back. This was the point at which

my thinking was shattered by the violence of my plane captain's slamming the gear handle down.

Cockpit complacency is my most dangerous enemy. Perhaps other readers will find this enemy lurking in the background of their flying habits.

SEE SAW

THE copilot was in the left seat as we returned to home base from a scheduled logistic hop. Weather was CAVU and as it was Saturday afternoon there was little or no traffic airborne around the field.

We let down with the field in sight and the copilot asked if he could enter downwind. The tower said okay. I called downwind, and then base with gear down. My attention was drawn to the end of the runway as the copilot was over-shooting the windline. He corrected and I saw we were going to land on the runway so I checked the wheels watch for a green light.

Flareout was normal with touchdown slightly to right of centerline. I looked up ahead and saw a flock of birds flying across in front of us but way up ahead I saw a TV-2 landing, opposite direction, its gear just off the deck and heading towards us. Talk about your misunderstanding of words: I shouted "watch out for the bird!" meaning the TV-2 but the copilot looked for a bird (feathered type) to come through the windshield.

I didn't have nose wheel steering on my side and the copilot hadn't seen the jet yet. I applied brakes to slant us to the right, hoping we could pass on the runway.

The "T-bird" braked to the right but the pilot was startled to see us and he sheared his right gear on the arresting gear chain. Off the runway he went. Both aircraft stopped abreast of each other. Out popped the two jet pilots but there was no fire.

The situation began with the TV shooting some practice GCAs. The tower told GCA to have the jet waveoff at 500 feet and GCA passed this instruction along. However, the pilot decided to land instead.

At Operations I met the two pilots who turned out to be transients and mostly concerned on how to get home for dinner that evening. Then, lo and behold, out of the blue lands a C-47 heading for the happy household. The pilots climbed on board and shoved off, minus their aircraft. Total deck time for them: 90 minutes. Total grey hair for me: too awful to talk about.

SLIPSTREAM

AS WINGMAN in a two-plane section of AD5Ns I followed the leader up through 7000 feet of soup. When we broke out on top at 9000 his engine began belching black smoke and running rough.

He called on tower frequency for an emergency radar monitored return to the field. I failed to receive the radar frequency and remained on tower frequency, flying wing on the leader back down through the soup again.

As we broke out below the clouds the tower cleared us for a section landing. I took what I thought was a proper interval but the winds were calm and I didn't allow for this. As the leader approached the threshold I completed the landing checklist. The prop was left at 2600 rpm instead of full 2900.

At about 75 to 100 feet I went into violent slipstream and started into a slow roll to the left, completely uncontrollable. Power, opposite aileron and full rudder permitted me to regain control but before it was done I had overboosted a brand new engine by 8 to 10 inches of manifold pressure.

With calm winds I found it should be automatic for pilots to take a longer landing interval to allow slipstream to diminish. Ground observers estimated my recovery altitude as house-top level. Ranch house, that is.

SOONER OR LATER

AFTER a normal start we taxied out and took the duty runway for a section takeoff in F8Us with afterburner. The leader gave the turnup signal and everything checked fine. We released brakes and lit the burner.

Airborne, with gear up, the leader nodded his head to lower the wing. At this time my fire warning light came ON and almost immediately the tower called and said the wingman (me) had flame torching out the tailpipe. I heard a muffled explosion and felt a loss of power but felt it was unwise to come out of burner until the wing came down. Also, I didn't know what was wrong or what might happen when I came out of burner.

About two or four seconds later I reduced throttle to military power, minus about two percent. The tailpipe temperature was normal and I continued the climb to 2000 feet. *Anymouse doesn't say but apparently the fire warning light went out—Ed.* Wing fuel was dumped and I made a circle around the field before coming in for a landing.

The engine was removed and a broken pigtail to one of the afterburner spray bars was found, plus four small holes in the cooling air duct on the starboard side.

Next time I believe I would come out of afterburner immediately if circumstances permit. Then if the light stays ON and you have indications of fire there is little choice but to reach for the face curtain.

Flight leader's comment: Anymouse handled the above in a cool manner. Being more aged myself, I believe I might have ejected—too soon it would have turned out. ●

headmouse

Have a problem, or a question?
Send it to HEADMOUSE—he'll do his best to help.

Mark Altimeters

Dear Headmouse:

After having read continuing reports on improper reading of altimeters, I think more suggestions should be offered.

After considerable thought I suggest that upon overhaul of the present altimeter the numbers 100, 1000, and 10,000 be stamped or otherwise marked on the respective needles until a better solution is reached.

R. L. MONTGOMERY
A/Sgt. USMC
SOES CPNC

► Consensus here is that marking altimeter pointers thusly would be just as confusing as ever. Until we get an improved altimeter it appears the solution lies in more readyroom skull practice and additional emphasis on this phase in Links and OFTs.

Very resp'y
HEADMOUSE

Flight Clearance

Dear Headmouse:

Suppose Moffett weather at 2200Z is 100-½, and it's forecast to go clear and 30 at 2330Z. I want to depart North Island for Moffett at 2230, with 2 hours enroute; the enroute weather is VFR—can I file VFR?

ANYMOUSE

► We suspect that you've already experienced this situation, Any, and that you want to know why you were turned down, right? Well, turn to OpNavInst 3710.7A, Section VII — "Air Traffic Rules." In item 2, "Visual Flight Rules," you'll note that " . . . visibility *at all times* must be . . . " and that the minimums apply to point of departure, destination, and enroute flight. No mention of forecast is made. So you can't file VFR because at the time of your intended departure the destination is not VFR. The only time forecast weather is applied to VFR flight is in reverse—that is, if everything is VFR all the way but destination is forecast to go IFR, you can't be cleared VFR. Keep in mind that air traffic rules and regulations are designed to keep you OUT of trouble, so they're designed with some "fail-safe" philosophy in mind.

Very resp'y
HEADMOUSE

Mix

Dear Headmouse:

A couple months back, while on an actual GCA into an AFB, I was given a frequency shift just before intercepting the glide path. To aggravate the situation the change was given to a "channel" instead of the frequency, requiring two more transmissions.

All this was with no prior warning. It would appear that this is a dangerous time to be milling around in an aircraft. Ten seconds lost at this point could ruin the whole approach.

ANYMOUSE

► When in Rome, be prepared to do as the Romans do. Note USAF channelization and detention facilities (see enroute—supplement), and you can usually plan in advance what frequencies, channels, buttons, _____, crystals you need to set up. Generally, both services are trying to minimize changes at such critical spots. Sometimes you can request no frequency change from final controllers if the situation genuinely requires it.

Very resp'y
HEADMOUSE

Jetcal Technique

Dear Headmouse:

In the November issue 1958 APPROACH, page 26, paragraph 1, Chief C. V. Parker, NAS Olathe, Kansas, requested information on the proper use of the Jetcal Analyzer in performing temperature measurements on dual indicating systems.

Specifically he wanted to know if there would be an error in measurement on the Jetcal if one of the two temperature indicators remained connected in the circuit while the Jetcal was connected to the terminals of the temperature indicator of the other cockpit.

Your answer was, there would be no change in temperature indication. However, this answer is erroneous. There would be a rise in temperature indication on the cockpit indicator and a decrease in temperature indication of the Jetcal. Accurate temperature measurements, utilizing the Jetcal, must be performed with no current draw-

ing device in the circuit under test.

I think you owe Chief Parker a well earned apology.

OWEN G. RILEY
Tech Rep. R&M Inst. Co.

► When using the heater probes and not using the tabbing box, a dual system may be checked without removing either instrument from the system. However, Chief Parker specified using the tabbing box in one cockpit and with this use the other cockpit instrument must be disconnected to obtain accurate system readings.

Tests run at NAS Oceana on a VA-43 aircraft with representatives of B&H, VA-43, FASron 5 and members of NASC proved that with the tabbing box in one cockpit the other cockpit must be disconnected, otherwise a high indication would result on the cockpit instrument and a low Jetcal reading would be obtained.

Chief Parker was correct in his letter and the November APPROACH answer was wrong.

Very resp'y,
HEADMOUSE

Maintenance Quality Control

Dear Headmouse:

I was pilot of a TV-2 on a cross-country training flight making a radar controlled penetration to a central USAF base. During the descent, while operating on 100 percent oxygen, I pushed up on my oxygen mask to relieve pressure on a sore nose which broke the mask seal on my face and was greeted by strong JP-4 fumes.

A visual inspection of all gages, warning lights and visible exterior surfaces gave no indication of the source but there was an abnormal amount of an oily substance on the canopy near the pressurization vents. With the field now only three miles and lined up on the duty runway an expedited landing and securing of the aircraft was made.

Inspection revealed that I was extremely fortunate to still be here to play Anymouse. The fuel had commenced leaking when maintenance repairs had been made to the fuselage tank and fuel was entering the cockpit through the pressurization system. Upon removal of the lower inspection plates and fuselage tank access cover, fuel was discovered in quantity on top of the tank. Fuel seeped down into the plenum chamber and drained onto the deck when the fuselage tank was full and the aircraft was not in a level attitude.

The culprit has been discharged but here is a list of discrepancies detected of which any item could have been fatal:

1¼" fuel return vent hose clamp missing from T-assembly.

Loose screw, not lock-wired, on fuel quantity transmitter creating leak.

Fuselage fuel tank inspection door bolts single lock-wired instead of double; lock-wire installed in reverse to loosen bolts rather than hold them tight.

T-fitting flange warped due to overtorquing which destroyed gasket seal and caused leaking.

Improper length bolts, one loose due to stripping and one with six washers, none lock-wired, on fuel float valve cover.

Last but most serious there was only one out of three gaskets installed on the three float valves and the one installed was useless since it was installed improperly which allowed fuel to flow freely over the top of the tank during the descent.

In this case a questionably qualified mechanic had reported the repairs completed and signed off the work sheets without qualified post-maintenance inspection. Since the pilot cannot inspect this critical area once the access plate is installed and the leak will not show up unless the fuselage tank is overfilled or the aircraft is in other than level attitude he is dependent upon the maintenance team to do the job correctly and protect his life and costly equipment with a qualified post-maintenance inspection.

Since, I was told that a TV exploded on climbout under a possible similar situation. That pilot had reported fumes during descent, had made a visual inspection and sniff check with negative results, but was in too much of a hurry to remove the inspection plate and take a look.

How good is your post-maintenance inspection?

ANYMOUSE

► As a USAF commander recently said after receiving an anonymous report of a near accident—"This information comes to us for free—We've paid dearly for a lot less information."

It's anybody's guess what an accident board would have produced for causes. It could have been missed by a country mile.

The board's corrective action might have been equally out in left field. Its recommendations might have included million dollar modification programs, further restrictions to flying and so on.

As it stands, we have received the following benefits:

We didn't have an accident.

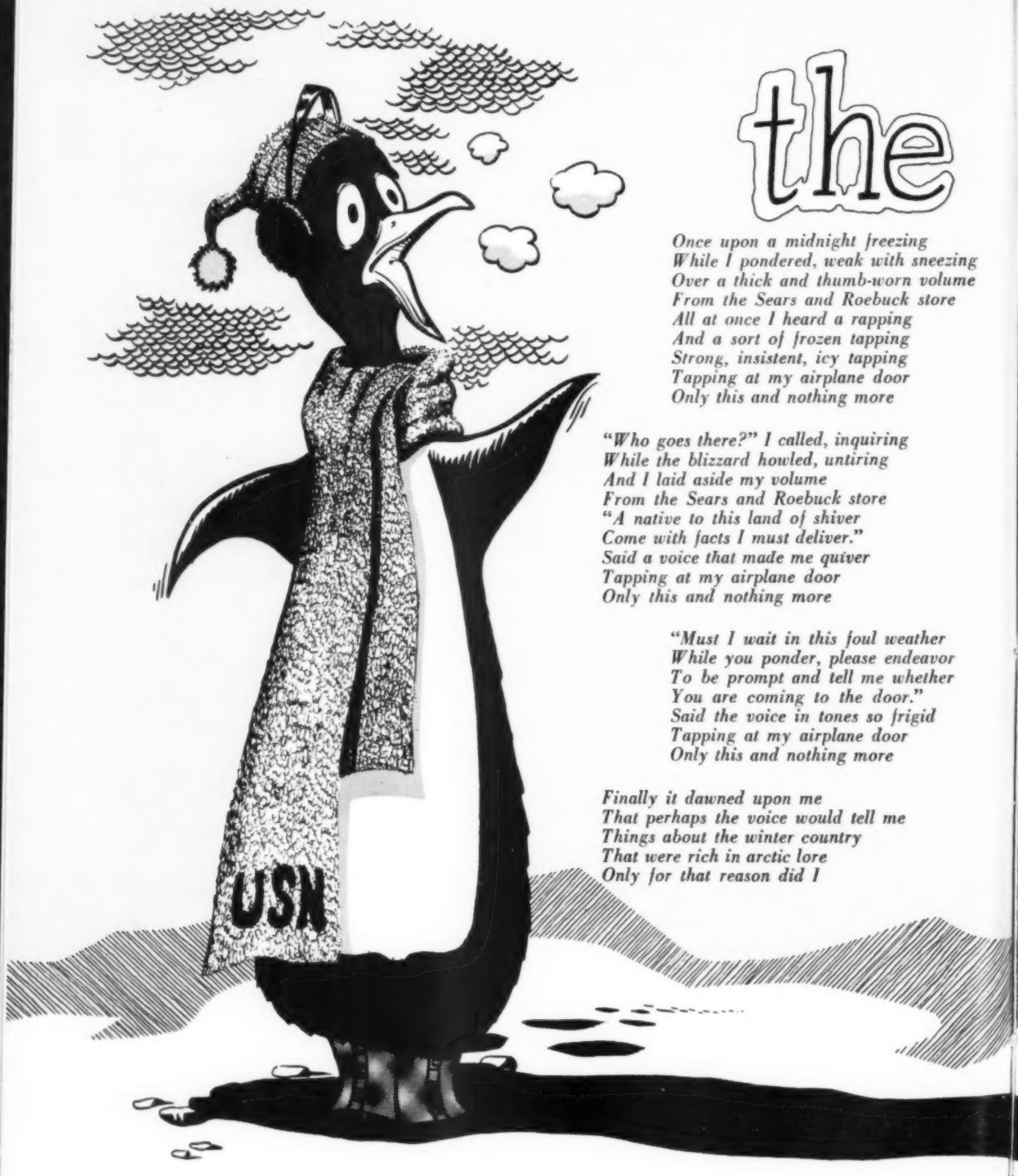
We've avoided the possibility of taking wrong corrective action.

We can now take practical corrective action to prevent an accident from this source—before it happens.

In other words, because a pilot or mech took the time and trouble to report an accident that should have happened but didn't, we received a package of accident prevention worth possibly millions of dollars for free. We could—and do—pay millions for less. All this is a courtesy of the ANYMOUSE Report.

There are thousands of just such big bargains waiting to be picked up in naval aviation today. These bargains are exactly what every squadron needs in its flying safety program. And the same squadrons are generating them every day. When you have one, turn it in. It is one of the best buys naval aviation will ever get.

Very resp'y,
HEADMOUSE



the

Once upon a midnight freezing
While I pondered, weak with sneezing
Over a thick and thumb-worn volume
From the Sears and Roebuck store
All at once I heard a rapping
And a sort of frozen tapping
Strong, insistent, icy tapping
Tapping at my airplane door
Only this and nothing more

"Who goes there?" I called, inquiring
While the blizzard howled, untiring
And I laid aside my volume
From the Sears and Roebuck store
"A native to this land of shiver
Come with facts I must deliver."
Said a voice that made me quiver
Tapping at my airplane door
Only this and nothing more

"Must I wait in this foul weather
While you ponder, please endeavor
To be prompt and tell me whether
You are coming to the door."
Said the voice in tones so frigid
Tapping at my airplane door
Only this and nothing more

Finally it dawned upon me
That perhaps the voice would tell me
Things about the winter country
That were rich in arctic lore
Only for that reason did I

—Adapted from USAF "Maintenance Review"

penguin

Open wide the airplane door
Only that and nothing more
Honestly I was confounded
Lesser men would be astounded
All the rest, no doubt, dumbfounded
By the creature at my door
T'was a PENGUIN who was tapping
Tapping at my airplane door
Just a penguin, nothing more

"Let me tell you things that matter."
Said the penguin, teeth achatter
"Wintertime can have no terrors
For the man who makes no errors."
Said the penguin as he waddled
Waddled through the airplane door
That he said and plenty more:

"Up in the arctic in mid-December
You're not in Miami so please remember
Good warm clothes and sturdy shoeses
The guy who forgets is the guy who loses

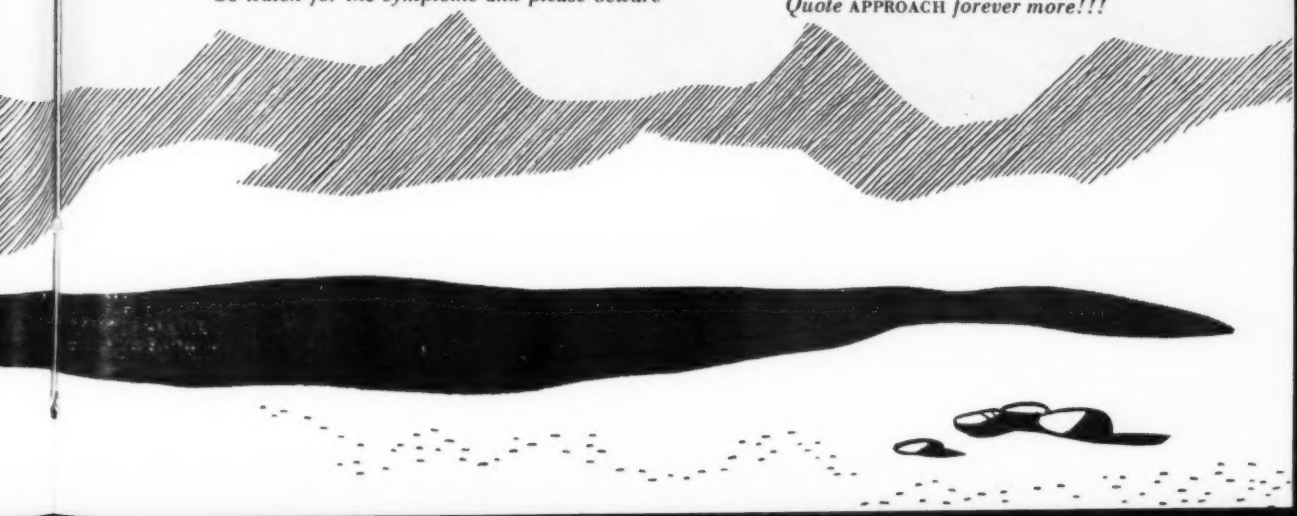
Carbon monoxide's a lousy cheater
So watch that Herman Nelson heater
If you start feelin' groggy and head is hurtin'
Have doc run a check to be really certain
That it's not CO, 'cause the way they tell it
The stuff is deadly and you can't even smell it

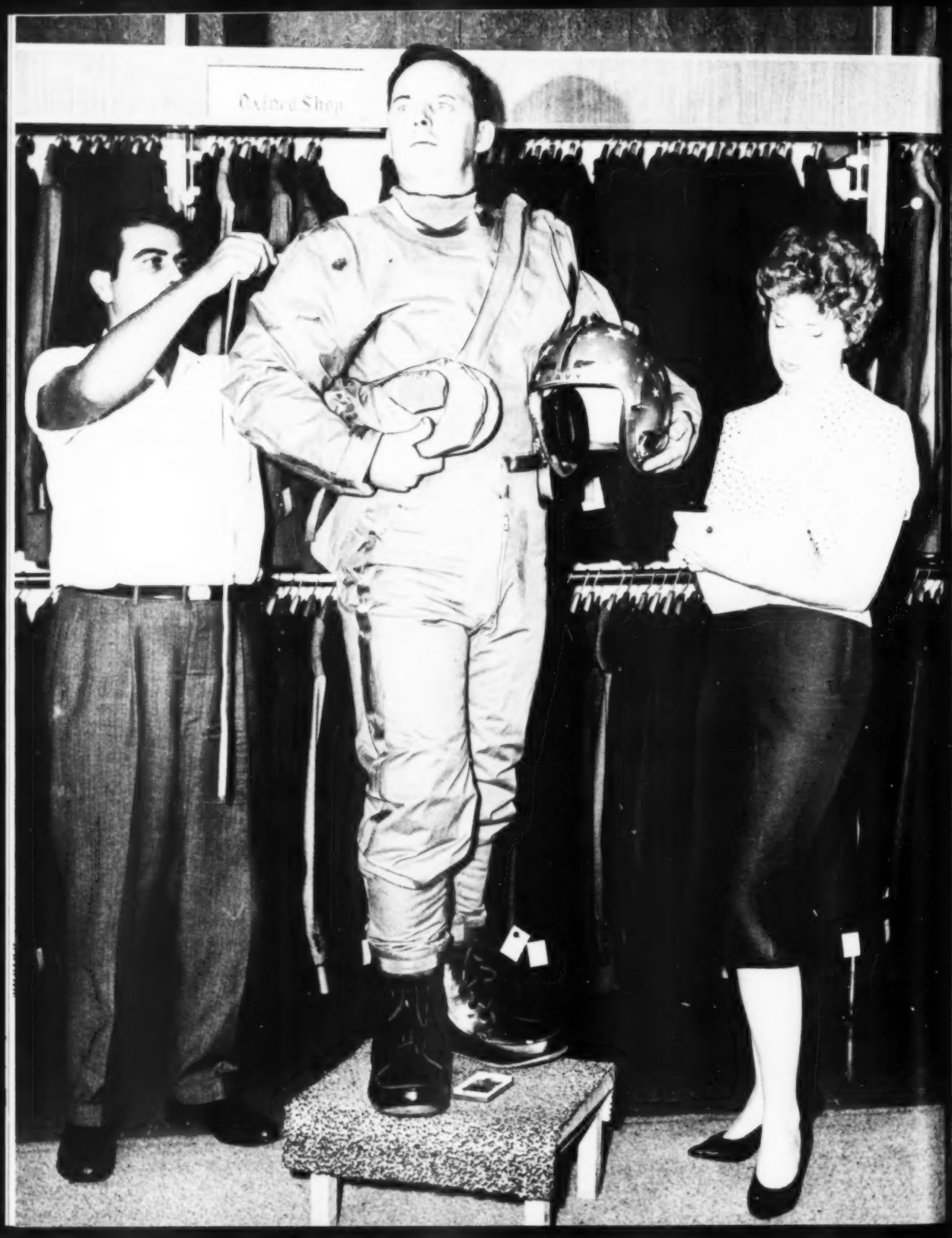
Frostbite will getcha if you skip care
So watch for the symptoms and please beware
Of prop wash and wing, the two main reasons
For frostbit men in wintry seasons
Snowblindness too is rather bad trap
That snares the unwary so don't be a sap
A pair of sunglasses is all you need
To avoid being caught, so take good heed

Preheat the engine on every jet
For if you don't it's safe to bet
That when you try to start the beast
She'll shudder and shake to say the least
And out of the pipe so round and nice
Nuts and bolts and chunks of ice
Will drop to the ground and while they're droppin'
You'll say to yourself, no doubt, "Wha' hoppen?"

So it went into the dawn
Until the penguin copped a yawn
And said to me "I told you all,
But never hesitate to call
In time of need I'll be around
My ear is always to the ground."
With that he left and went away
I haven't seen him to this day
Perhaps some other snowbound guys
Someday will host this penguin wise
He got his facts and so will you
By closely reading this review . . .

The Naval Aviation Safety Review.
Quote APPROACH *forever more!!!*




Oxford Shop

Suit Yourself

MOST men enjoy picking out a new suit now and then—whether it comes off the plain pipe racks out in the low rent district or is a lean looking set of ivy league threads hand turned by a fashionable tailor. Nowadays the big move is to functional attire—dress for the occasion. A wild pair of plaid shorts will even go with a bosom shirt and black bow tie for a hot weather formal. The "comfortable look" is replacing the traditional odor of wet wool.

Dressing for the occasion is even more important in the cockpit than it is at the Sunday tea dance. Using poor taste in selecting your dance costume is not likely to become a matter of survival.

Nobody is going to argue that the MK-4 continuous-wear anti-exposure suit looks as dapper or feels as luxurious as a snappy suit of tweeds. But if the occasion calls for an invigorating swim of indefinite duration in frigid waters, take the MK-4 every time—the tweeds just won't hold up.

Acute general hypothermia, or heat loss, resulting from immersion in sea water at temperatures below 68°F. is a serious hazard to aviation personnel faced with the possibility of ditching or overwater bailout or ejection. The human body immersed in cold water loses heat many times faster than in air of the same temperature. Below 68°F. body heat is lost faster than it can be replaced. Water greatly reduces the insulating properties of clothing and displaces the layers of still air which normally surround the body and hold heat. A man wearing ordinary clothing can survive only a few hours in moderately cold water (50°F.-68°F.). In the frigid seas of the polar regions where water temperatures from 32°F. down to as low as 28°F. are common, survival is a matter of minutes.

Whenever cold water immersion is even a remote possibility, common sense and the instinct for self-preservation dictate that pilots and crewmen wear anti-exposure suits.

The anti-exposure suit is designed to give the wearer warmth and buoyancy in cold water and to protect him from rain, wind and spray in a life raft. The suit also gives protection against exposure on land.

Two types of anti-exposure suits are available to Navy pilots and crewmen. These are the R-1 quick-donning suit, and the MK-4 continuous-wear suit. In accordance with OpNav Instruction 3710.7A, quick-donning anti-exposure suits are carried by all patrol and transport type aircraft on all overwater flights as required by type or fleet commanders. Continuous-wear anti-exposure suits are worn by pilots and crewmembers of carrier and other type aircraft when required by fleet commanders.

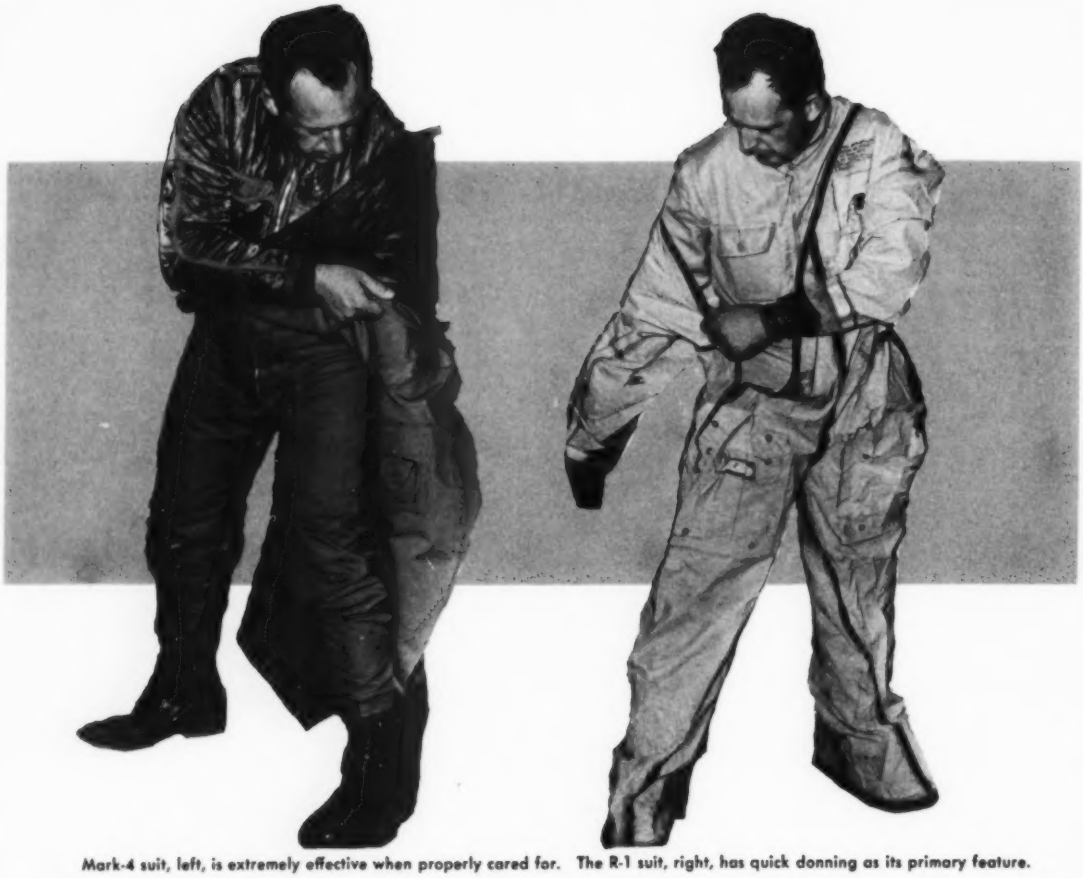
Quick-Donning Anti-Exposure Suit

The quick-donning anti-exposure suit is designed for donning immediately before or subsequent to landing at sea. The suit will protect the wearer up to an hour in water temperatures as low as 28°F. and for a longer period aboard a life raft. The time may be extended if the wearer's head and hands are protected.

The quick-donning suit is a single piece coverall type garment with an attached hood. It

Wind Chill

Everyone knows that it feels colder when the wind blows, but most people don't realize how much colder it is. For example, if the temperature is expected to be 34°F. and the expected wind velocity is about 20 miles per hour, the effect on exposed flesh is the same as 38° below zero with no wind! If you'd like to see the *Wind Chill Chart* (U. S. Army Study), ask your Flight Surgeon for a look at his BuMed Newsletter, Vol. 32, No. 12.



Mark-4 suit, left, is extremely effective when properly cared for. The R-1 suit, right, has quick donning as its primary feature.

is made of a light waterproof material, yellow-orange in color. The suit envelops the wearer except for his face and hands. It comes in one size (very large) which will fit almost any man in complete flight gear. The suit is packaged in a carrying pouch.

Two sea dye markers and mittens with a nylon "shell" and a woolen insert come with the quick-donning anti-exposure suit. These items can be ordered separately if necessary. The mittens are carried in the anti-exposure suit pockets and are normally put on after boarding the life raft. Although not waterproof, the mittens provide warmth and protection against exposure even when wet.

The hood on the quick-donning suit is full enough to be worn over headgear. It has a liner which creates a seal around the face. The hood can be inflated for extra insulation by means of an oral inflation tube.

Donning the R-1

If it becomes necessary to abandon an aircraft while over water and there is time, the quick-donning anti-exposure suit should be put on over the flight clothes but under the life vest and parachute harness. If time is short, the suit can be put on over the life vest (but *under* the parachute harness, unless ditching). The Navy *Safety and Survival Equipment Manual* (NavAer 00-80T-52) states that the life vest can be inflated through the suit by feeling for the toggles and pulling them. After the life vest is inflated, the manual advises pushing the toggles back into their original position to avoid possible puncture of the suit.

Areas in Which Quick-Donning Suit to be Used

The quick-donning anti-exposure suit is intended generally for use in the geographical areas indicated in BACSEB 46-54 which also contains detailed instructions for putting on the suit.

Continuous-Wear Suit

The continuous-wear anti-exposure suit is designed to be worn by personnel on cold weather

Representative Survival Times

The following estimates have been made of the period of survival which can be expected by a man without watertight clothing when immersed in water at various temperatures. It should be emphasized that considerable deviations are to be expected among individuals. Because men have lived for many hours longer than the indicated figures, the search for survivors should not be stopped merely because the table shows that some of them may have succumbed.

Water Temperature	Duration of Survival
32°F.	Less than 1 hour
40°F.	½ to 3 hours
50°F.	1 to 6 hours
60°F.	2 to 24 hours
70°F.	3 to 40 hours
80°F.	Indefinite

—BuMed Medical News Letter Vol. 31, No. 12

flights for warmth and buoyancy in case of emergency free bail-out, ejection or crash landing. The suit protects the wearer from exposure after leaving the aircraft in cold areas on land or sea. In sea water at freezing temperature, the suit and liner can give protection for at least one hour. This time can be extended if the head and hands are protected. On land the suit will give protection for extended periods of time even in subzero weather.

The MK-3 continuous-wear anti-exposure suits which may still be in service are the equivalent of the MK-4 in ability to protect the wearer from the elements. Differences are in fabric, tailoring details, liner sizes and modifications of the entry portal. The improvements were the result of recommendations and suggestions of fleet activities and further development by BuAer research facilities.

To receive full benefit of the continuous-wear anti-exposure suit's design, it is important that flying personnel wear the suit and accessory items and clothing exactly as described in BACSEB 6-56 and BACSEB 7-56. These directives also give instructions to the parachute rigger for sizing and replacement of wrist and neck seals and for attaching the boots. Care, inspection, maintenance, minor repairs and cleaning are also described.

Characteristics of the MK-4 Suit

The continuous-wear anti-exposure suit consists of an insulating liner and an outer suit of waterproof material with attached boots and accessories including gloves. The one-piece liner is a garment of quilted rayon-covered insulation with knitted wristlets and anklets. It is tailored and sized for close body fit. It is being replaced by the two-piece winter flight suit which is also authorized for use as an inner liner for the continuous-wear anti-exposure suit.

Current workhorse is the Mark-4 suit, flexible and not too uncomfortable when properly fitted. Pilots' primary complaint is lack of ventilation.

What the well-dressed pilot will wear—the Mark-4 suit may not be competitive in fashion, but its life-saving value makes it an easy winner.

Although the outer suit is waterproof, it allows moisture vapor (perspiration) to pass through. The outer suit has elastic wrist and neck seals. In a survival situation on land, the suit may become uncomfortable due to exertion and perspiration. Under such circumstances, the wrist and neck seals can be cut away and replaced by wrappings of parachute cloth. Pockets for gloves and equipment are attached to the suit. Entry and relief portals are equipped with a rolled-type seal and slide fastener.

Type 4 Boot for MK-4 Suit

The individually sized Type 4 boot for the continuous-wear anti-exposure suit was developed from a combat infantry model. If properly fitted, the boot is a comfortable walking boot. It is designed to be worn over a lightweight or mediumweight sock, and is laced for snug fit.

The Type-4 boot has a sealed air chamber for protection against cold. The air in the chamber expands with increasing altitude. It can be vented by a small valve to relieve discomfort at high altitude. The valve should be kept closed at all times except when venting the air chamber. If the vent is left open, damp air and moisture may get into the air space between the inner and outer shells and greatly decreases their insulating value.

MK-4 Accessories

Accessories furnished with the continuous-wear suit are mittens and a G-suit hose cover. The mittens are quick-donning and have sealed insulation. Left and right are interchangeable. The mittens should be rolled up and carried in the pockets to which they are attached by lanyards. The G-suit hose cover is a rubber sleeve fitted with a finger tab to facilitate covering the G-suit opening. A cap and O-ring are provided to seal the opening when the G-suit is not used.

Desirable accessories not furnished with the continuous-wear anti-exposure suit are a detachable alpaca-lined winter parka hood, five-fingered winter or summer gloves and a watertight G-suit adapter. The G-suit adapter is a small self-closing valve which is inserted in the end of the G-suit hose to keep water from going into the bladder of the suit.

Recommended Clothing Items

To obtain maximum protection from the continuous-wear anti-exposure suit assembly, the following items of clothing are recommended. They are listed in the order in which they should be donned:

1. Heavy woolen underwear
2. Anti-G suit (if worn)
3. Pair of lightweight or mediumweight socks
4. Insulation liner (pass the G-suit hose through the opening in the liner)
5. Outer suit.

Helmet, life vest and parachute are worn in the usual manner. The suit has a large amount of positive buoyancy due to trapped air in the suit, boots and insulating liner. Only when completely full of water does the assembly reach zero buoyancy. For greater ease in swimming, it is advisable to get into an upright position and release the trapped air by pulling the neck seal away from the neck.

Alternate Methods for Wearing MK-4

There are two clothing combinations most practical for wear beneath the continuous-wear anti-exposure suit, if the standard inner liner is either not available or is deemed unnecessary. There are 1) the AL-1 alpaca-lined flight jacket and WL-1 lined flight trousers and 2) the woolen flight shirt and Army QMC trousers. When worn with the MK-4 suit the comparative duration of protection afforded by these alternates is shown below:

Depending on the anticipated time before rescue, BACSEB 40-54 states that pilots wishing to dispense with the MK-4 liner can do so safely if they don the clothing assemblies mentioned here. It should be emphasized the variations in personal tolerance to cold may account for even shorter periods of protection when using these alternate clothing assemblies.

	AL-1 Jacket and WL-1 Trousers	Woolen Flight Shirt and Army QMC Trousers	Standard MK-4 Liner
25°F. Air 50°F. Water	Comfortable after 1 hour	Cool after 1 hour	Comfortable after 1 hour
0°F. Air 40°F. Water	Cool after 1 hour	Very cold after 45 minutes	Comfortable after 1 hour
—40°F. Air 28°F. Water	Cool after 1 hour	Very cold after 35 minutes	Comfortably cool after 2¼ hours

Care of Anti-Exposure Suits

When not in use, each continuous-wear anti-exposure suit should be hung on an individual hanger in a cool and well-ventilated area. The suits should never be stored in sunlight. A careful inspection of the entire anti-exposure suit assembly should be made at frequent intervals with special attention to the non-fabric areas. All personnel using and handling anti-exposure suits should exercise extreme care to insure conservation of this equipment. The use of rough woolen and stiff cotton garments, as in the case of the alternate methods of wearing the MK-IV suit may cause abrasion of the inner rubber coating of the outer waterproof garment and shorten its life. The soft, comparatively non-abrasive material of the MK-4 insulating garment does not aggravate wear of the outer shell. Major repairs should not be attempted locally. Any suit which is damaged should be sent to the supporting activity for forwarding to the proper overhaul point for repair.

The Mark 5 constant-wear exposure suit is presently being evaluated, has several desirable features which Mark-4 wearers will appreciate.

So now you know what the well dressed survivor is wearing. The parachute rigger is your tailor. Remember, while he is giving you a fitting, that the cut of your neck seal is even more critical than the sweep of your slim line lapels—a well glued boot is more vital than a well draped pleat.

Here is a testimonial from a satisfied customer of the MK-4 toggery, "Water temperature was 33°F., air temperature 19°. I was rescued 10 minutes after ditching my AD-4. Mild shock was my only injury. My continuous-wear anti-exposure suit had kept me warm and dry." He was a very fussy customer — you be fussy too. ●

AUTOMATIC RESPONSE

Through knowledge, forethought and training you can so thoroughly indoctrinate yourself in correct ejection and bailout procedures that if you should have to bail out or eject, you become almost an "automatic pilot."

Here's a case in point:

A pilot on his first flight in the F3H-2 made a normal takeoff in afterburner. Three minutes later, there was a violent explosion in the after fuselage which shook the airframe. Immediately going into a climbing zoom, he made two unsuccessful attempts to regain lost engine power.

He noted his altitude was 6500′ and decided to eject rather than attempt a forced landing. His airspeed was approximately 150 knots.

In the pilot's own words, from the moment he made his decision to eject, "things went smoothly."

He positioned himself properly, disconnected his oxygen hose and radio leads, and saw that all straps were tight. He pulled the curtain to the first stop, watched the canopy blow, then completed the pull and ejected. The seat belt separated automatically and without tumbling he kicked away from the seat.

He manually actuated his parachute.

"When I saw I was clear from the seat, I pulled the ripcord. The D-ring was right where it was supposed to be because the chute harness was tight. I landed feet first in the water and had no difficulty in freeing myself from the chute harness. I inflated my mae west and grabbed hold of the life raft pack. Then I inflated the life raft and climbed aboard. About 15 minutes later, a chopper picked me up. I received no injuries."

The reporting flight surgeon had no recommendations in this case except to suggest that other aviators be told the importance of having ejection procedures so deeply ingrained in their minds that they can be performed without hesitation—quickly and efficiently.

notes from your FLIGHT SURGEON

Flight Suit Cuffs

WHILE on a medium angle loft maneuver run-in, the pilot of an A4D-2 reached forward to uncage the LABS gear. As his arm moved forward over the throttle, the flare at the cuff of the left sleeve of his flight suit caught on the wheel handle and moved it to the mid-position. This was enough to lower the gear. The pilot heard an explosive sound and the aircraft began to buffet. The left main gear had collapsed and the hydraulic lines had been severed. Returning to base, the pilot made a successful arrested landing on foam.

"I had been briefed by the A4D flight instructors concerning the fact that the landing gear handle could be inadvertently lowered when uncaging the LABS gyro," the pilot states in the AAR. "However, I am firmly convinced that the pilot should not be required to have to consciously avoid the landing gear handle when he is at as critical a position as . . . on a loft bombing run-in. I also feel that with the installation as it is at present that more accidents similar to this could occur and with more serious consequences."

The cause of the accident was determined to be human engineering and cockpit design. The Aircraft Accident Board recommended that:

- A positive up-lock device be provided for the landing gear handle of all A4Ds. (*There have been several similar incidents since this one earlier this year.—Ed.*)
- That flight suits with zippered cuffs on the sleeves and legs be provided as soon as possible. (*BACSEB 9-56 describes the approved interim modification of sleeve and trouser cuffs of the present summer flying coveralls by the installation of cuff straps. New suits are being procured with zippers.*)

Disconnected

REPORTS continue to be received that F4D-1 pilots' anti-G suit hoses are becoming separated from the D-500 disconnect during some phase of flight. BACSEB 9-58 of 3 October 1958 establishes a modification of the D-500 disconnect which reduces the possibility of the anti-G suit hose becoming inadvertently disconnected in the F4D-1. The subject of BACSEB 9-58 is: *D-500 Composite Disconnect, F4D-1 Aircraft, Replacement of the female half P/N 13212 with the female half P/N D-501-1; instructions concerning.*

Squadron material officers should requisition this item through their normal supply support channels. The Federal Stock Number for the D-501-1 Disconnect is RH1680-629-1026-X110.

Hands Off!

AFTER loss of RPM on takeoff from a carrier, an HR2S-1 was ditched alongside the ship. All six men aboard escaped without injury and were picked up.

Had the accident taken place in an area further from help, the story of one of the survivors, at least, might have been tragically different. When the copilot surfaced after escaping from the sinking aircraft and pulled the toggles of his life vest, nothing happened. It did not inflate. After his rescue, it was found that *there were no CO_2 cylinders in the life vest.*

Of course, it would have been possible for the copilot to use the oral inflation tube, but as the reporting flight surgeon states, this discovery points up the importance of aviation personnel performing a thorough preflight check of their personal safety equipment.

"It is also worth noting," he continues, "that this is the fifth time since the squadron has been aboard (this carrier for this training exercise) that mae-wests have had CO_2 bottles removed by thoughtless individuals. It is apparently necessary to impress upon non-aviation personnel the importance of not tampering with aviation gear."

Human Engineering

THE pilot of an F4D-1 returning to base from an air-to-air gunnery flight raised the tail hook after releasing his tow. Evidence indicates that, while doing so, he accidentally turned his battery switch OFF. The off position of the battery switch caused indications of hydraulic malfunctions that did not actually exist. The pilot ejected successfully at 2800 feet.

In its report the aircraft accident board states, "In the present cockpit configuration of the F4D-1 it is easy to inadvertently place the battery switch OFF. It is recommended that the present battery switch in the F4D-1 be modified so as to prevent inadvertent operation. This could be accomplished by placing a guard over the switch or by changing the switch so that it is necessary to lift it before moving it from ON to OFF. It is further recommended that the attention of all squadrons operating the F4D-1 be made aware of the likelihood of the switch being turned OFF while operating the tail hook control handle."

THE HOLOCAUST

Based on Material Contributed by 3rd MAW

"Ladies and gentlemen, this is your on-the-spot TV reporter, Jack Gaylord, bringing you direct coverage of one of the worst fires ever encountered in the military services. As the camera pans around, you can see the extreme damage that has been done and the fire still raging all about us."

"Just a moment, sir, aren't you Lieutenant Commander Altraind, the squadron maintenance officer?"

"Yes sir!"

"Commander could you explain to our TV audience just what started this holocaust."

"Why yes, I'd be glad to. I only hope that this disaster will emphasize what we have been teaching for years, the dangers of vehicles on aircraft flight lines.

"Early this morning we preflighted all of our planes for a 100 percent participation strike against a theoretical enemy off Catalina. About 0700, the NC-5 drivers plugged in to their assigned planes and on the pilot's signal, gave them the power they needed to crank up the jet engine.

"One of the NC-5s had a generator failure so the driver unplugged the electrical lead and drove the vehicle over there."

"Hey, Pete, run over there and get a shot of that spot."

"But, Commander, that's an incline."

"Yes sir, and that is how this whole disaster was born. The lad driving the vehicle climbed out of it, left the hand brake off and the gears in reverse. In a very short time the NC-5 started rolling back. Sure, a lot of the guys saw it, but by that time it was too late."

"But, Commander, is that the standard procedure, hand brake OFF and clutch in gear?"

"No sir. We instruct the drivers in proper procedures, there are tests they must pass and volumes of technical material on proper procedures for the operation of these starting units."

"Then what happened here? How could a thing like this happen?"

"Mr. Gaylord, if I knew what had gone on in that man's mind when he didn't use correct procedures, I'd know how to prevent hundreds of thousands of dollars in damage done every year in vehicles banging up aircraft."

"Could you go on, Commander, and tell us what happened then."

"The NC-5 rolled back and collided with Number 17 there. Of course all there is now is a pile of foam where the plane was, but believe it or not, less than an hour ago it was a 1½ million dollar piece of machinery. When the vehicle hit the plane it ruptured a fuel cell and the whole area, plane and NC-5 were just one big fire ball."

"But, Commander, I understand that altogether, 6 planes were lost."

"Yes sir, just another problem of spotting aircraft and training of personnel to meet all emergencies."

"Could you explain that a little.— Just a minute, Commander."

"Ladies and gentlemen, at this time I'd like to switch to our TV camera overhead in the ABCD helicopter. Take it away, Bob Wit."

"This is Bob Wit in the ABCD telecopter. Below us, as you can see, the fire continues to roar through the hangar. Most of the aircraft fires are out. It has been reported that about 10 million dollars worth of damage was done this morning by the roaring fire that swept through 6 aircraft and a hangar. That's about all of the view from up here, back to you Jack Gaylord."

"Now, Commander, back to our interview, could you explain your comment about spotting aircraft and training personnel."

"In the past, until this disaster, we have always spotted our aircraft in a line parallel to each other. When this plane blew up it caught the one on each side of it. Now, we have always trained our people as to what to do in an emergency. Of course you never know what they will do until something happens.

"When the planes on each side caught fire, the linemen were shocked and started to run in every

MAL KATZ

direction. It was then that Chief Quick got to the scene. He quickly grouped the men into teams and had them start moving aircraft by pushing them down the taxiway. The six that we lost were those the men couldn't reach because of the heat."

"Well, Commander, thank you very much. Do you have any comments that you think would assist in preventing a recurrence of something like this?"

"Yes sir, I'd say there must be closer supervision of vehicles operating on or in the vicinity of an aircraft flight line. Next we must find a safer way of spotting our aircraft so that the loss of one won't cause the loss of many. And third, we must insure proper training of personnel by having drills to fight the problem of disorganization in an emergency with results as we have just seen. Surprise drills with a specific aircraft designated as on fire would assist in preventing this panic."

"Thank you, Commander Altraind."

"Say there, Chief, Chief! Could we have a word with you?"

"Yes sir, but I still have a lot of little fires to worry about."

"Okay Chief, I'll be brief. Just how did the hangar catch fire and burn so completely?"

"Well sir, when the first plane went, the explosion sprayed burning fuel in the roof of the hangar. The fire crew from the squadron ran their hoses out, only 2 of them, and a number of fire extinguishers."

"But, Chief, that would be enough to put out a fire in its early stages."

"Yes, it would have, but those hoses weren't taken care of and only one held together. The other leaked so bad, no water came out the nozzle."

"How about the extinguishers?"

"Out of the ten at the scene, only 5 were charged. Someone had used the others and neglected to set them out for recharging. When the other 5 extinguishers were used, the one water hose was not enough and the fire drove that crew off. This whole thing, from the collision of vehicle and plane to the time fire fighting crews arrived was less than 10 minutes, yet the fire had taken such a hold that we lost those aircraft and the hangar."

"Well, thanks, Chief."

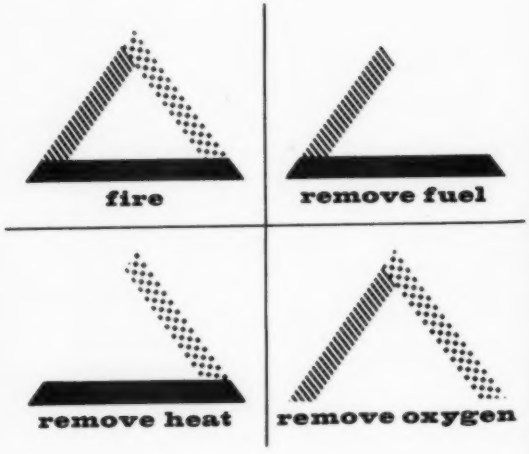
"Ladies and gentlemen, due to other commitments we must leave this scene and return to our studio for a movie. Just as we have commitments, so do you. Be sure your son and everyone's son is well schooled in driving a vehicle and the proper method of securing it when parked. Education on fire prevention, causes, what to do in case of emergency, and care of fire fighting apparatus must become a part of all of our lives if we want to protect ourselves against multi-million dollar losses.

"Thank you and good morning."

Always a threat, fire is one thing mechanics are constantly being educated and warned about. A fire in an aircraft can mean the death of hundreds, a fire on the ground can mean the death of possibly just a few but a cost in property that would stagger the imagination. A fire breaking out on a jet flight line and getting out of control can consume hundreds of millions of dollars in a matter of minutes. A hangar can be consumed by these licking flames at the cost of aircraft, tools, equipment *and* lives.

Just what does it take to make a fire. It takes, first of all—*fuel.* This fuel can be just about anything that will burn. Rags, oily preferred, wood, gasoline, oil, certain metals, all of these provide our first contribution to *fire.* The second element required is *oxygen.* There must be some form of it present to help support the combustion of the *fuel.* This can be pure oxygen or just air. Now we must get the proper ratio between the combustible and the oxygen. In the case of solid fuels, this ratio is not too important. The solid will burn with a minimum of oxygen to support the combustion. For vaporous forms of combustibles, there must be the proper ratio of gas and oxygen. Normally these fires will start with a roar (flash fire) and then resort to burning all combustibles that have been reached by the initial flames.

Flash fires are not restricted to the mixtures of fuel vapors and oxygen, they can be generated by the dust of any solid, in proper ratio with oxygen and fed by the third member of the triangle—*heat.* The last of the elements required to cause a fire is *heat.* This heat can be provided in many ways. A match, gas heater, electric heater, shorted wires, engine exhaust, all of these plus many more sources can supply the needed heat to the fire triangle.



Lack of fuel pressure integrity caused this explosion and fire—for details see page 42.

The most important factor to remember here is that *fire* needs all three of these items to survive. Take any one of the three away and you have killed the fire and the danger of fire. Now this enters into the aviation maintenance field in many ways.

Oily rags, or rags that have been used in cleaning aircraft or their components are one of the most dangerous and hard to control elements in a squadron. It seems that the natural thing to do when finished with one of these rags is to dump it anywhere that is handy. Sometimes this turns out to be a hiding place within the aircraft itself. This type of action is extremely dangerous in that *spontaneous combustion* can be generated at any time, on the ground or in the air. Let's take the fire triangle and see just where all of the elements for a fire enter into the picture for spontaneous combustion. When oxygen from the air combines with flammable material, heat is generated. Now this generation may be fast, and we see fire, or it may be extremely slow. Spontaneous combustion is an extremely slow generation of heat during which there are no visible signs of the building up dangers. After sufficient heat has been generated, the flammable fluid or solid bursts into flame. This generation of heat can be demonstrated by putting oily rags in an uncovered metal container. By keeping a constant check on the rags it may be noted that the temperature continues to rise at varying rates. When all things are in their proper ratio, the rags will burst into flame.

One of the ways in which we can prevent spontaneous combustion is the use of the proper receptacle for articles that may generate heat and cause a fire. All oily rags and combustible-liquid-soaked materials should be stored in metal containers, with lids, so that in the event combustion does take place, the fire will be limited to the container. By storing these articles in a covered metal container, we remove almost entirely one of the prerequisites of combustion—oxygen.

Notice that in the fire triangle there are three

items required before combustion can take place or be sustained—*fuel—oxygen—heat*. Remove any one of these and the fire is stopped. When a fire is soaked with water, it is put out due to the fact that the water has a cooling effect and the heat is removed while at the same time, if a fine spray is used, a large supply of the oxygen is also removed. If a storage tank of fuel is spilling out on the ground causing a fire and we shut off this supply of fuel, the fire is quelled. We have, in this case, removed *fuel* from the triangle and the fire will die.

Now, there are many more ways of stilling a fire other than with water. There is foam, powder, dirt, a blanket, any item that will remove the *heat* or *oxygen* from the fire. Foam not only assists in cooling the fire but it also smothers the fire by preventing oxygen from reaching the burning area. A small fire if attended to immediately can be smothered by throwing dirt on it and removing the source of air. A blanket will accomplish the same end effect if used early enough. It must be noted however that in many cases, water, with its cooling effect, is not to be used on articles that, when rapidly cooled, will explode. This is in particular reference to aircraft wheels and brakes.

It is extremely important that all personnel working in close proximity to aircraft, the hangars, offices, storage spaces, in fact anywhere in the military service be completely indoctrinated in the emergency methods of fighting a fire and how they are to summon the fire fighting equipment. It is surprising how many men in units aboard any military base do not know what the procedures are for the summoning of fire fighting apparatus. *Know the number for the fire department, know your area number*, where you are located and most of all be calm and precise in your directions and type of fire. *Speed* in combatting the fire is one of the most expeditious ways of reducing the loss of life and property. Effect emergency procedures *immediately* while the fire department is being notified. In many cases the primary cause of an uncontrollable fire was the fact that the person discovering it became excited, lost his sense of reasoning, and all in all became so overwrought at being faced with an emergency that he was useless as a fire fighter and an excellent helpmate to the fire itself.

Every man has a fire station. *Know that station* and be well acquainted with its equipment and the equipment on the station next to yours. In event of an emergency it may be necessary for you to man some other person's station and the tide of battle may very well be governed by your knowledge of that of that rig. Know what the chemicals are for fighting different types of fires and insure that you use the right equipment for the fire.

We in aviation must be more aware of the dangers of fire than in almost any other occupation. Even if we were to completely disregard the cost of the aircraft and surrounding aircraft hangars and other buildings, the loss of life could be staggering in the event of an in-flight fire. It is possible to lose over 100 lives if one of our transport planes should develop trouble of this kind. Our maintenance practices must be exacting and precise. We must use clean maintenance habits, that is, keep the working area inside and outside the aircraft clean, keep our tools and test equipment in good condition and clean. When working with electrical circuits we must keep them well insulated and *clean*. When working on any part of the fuel or oil system of the aircraft we must be especially cautious about leakages, sparking, fuming and any other factor that could contribute to starting a fire.

A blanket of foam cools fire and smothers fire by preventing oxygen from reaching the burning area.

It is extremely difficult to express the dangers and destruction of fire using the printed word. In order to emphasize the points contained herein it would be necessary to establish a lecture complete with slide and motion picture film. Anyone who has ever seen the true destructive force of fire, witnessed its aftermath of sorrow, seen the burned bodies and smelled the stinging, sickening odor of burning human flesh will agree that we must do our utmost to prevent such a conflagration within our units.

The tears of mourning cannot begin to extinguish the flames brought on through neglect and ignorance! ●

FOD

FOD Recommendations:

1. A Daily (AM and PM) shoulder to shoulder line policy by all units including reciprocating aircraft areas.
2. That tool boxes be inventoried following completion of repair.
3. That all intake ducts be inspected with the aid of a strong light after completion of repairs.—*1st MAW*

Induced Duct

A J71 engine received overhaul damage due to a foreign object passing through the compressor blades. The foreign object was an air intake duct left unsecured by night check. In investigating the accident several weaknesses of the maintenance system were evident.

(1) No work order covered the power plants part of the work.

(2) Failure of the shop correcting the discrepancy to replace the duct prior to signing off.

(3) Lack of continuity between the day and night maintenance crews.

(4) Failure of the maintenance chief to note the write up in the maintenance log prior to placing the aircraft in commission.

Does your maintenance system have these same weaknesses?

Pick-Pocket

After a normal start and engine run-up was made by the pilot, a check of all exterior lights was made by the plane captain. After noticing that the fuselage light on the underside of the aircraft was inoperative, he attempted to relay this information to the pilot. When he was unable to convey this information, he placed the access ladder in position on the plane and climbed to the cockpit in order to tell the pilot about the inoperative light. While the plane captain was in this position, the ground seat safety pins were pulled from his pocket into the intake of the engine by the suction developed by the idling engine. One of the pins went into the compressor section, damaging the first three stages of that section.

This accident was caused by an unsafe act on the part of the plane captain when he climbed up the access ladder, immediately in front of the engine intakes while the engine was running, with the safety pins in his pocket.

All plane captains should be thoroughly briefed as to the cause of this accident. People serving in a supervisory capacity should take immediate corrective action when unsafe habits on the part of persons working around aircraft are noted.

Foreign-Object Damage

Reports from several activities continue to point out the old bugaboo of engines being damaged as a result of foreign objects. At one activity, 11 engines are in work or awaiting repair for cold section damage caused by foreign objects. At least 50 percent of the damage was caused by leaving objects in the duct after work had been done. In an effort to eliminate future damage, a foreign-object-damage team has been formed to investigate foreign-object damage. All of the supervisors of the various shops have been notified to immediately report foreign-object damage to the team. This appears to be a step in the right direction and may be worthy of serious considerations. —*NAA Service News*

GROUND ATTACK

Accidents are not prevented by writing orders alone—Regulations must be understood, observed and enforced, if they are to do us any good. You, too, must help.

HERE is the Fiscal '59 aircraft ground accident picture—a total of 797 accidents were reported. These accidents cost us the lives of 9 airmen, 8.5 million dollars and more than 82,000 man-hours in repair of aircraft damage. A breakdown of the figures looks something like this:

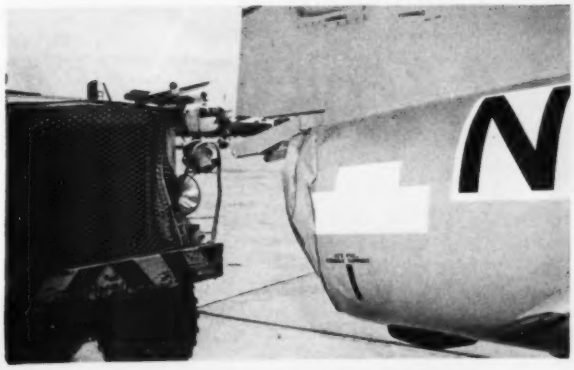
- Movement of aircraft by plane pushers and tow vehicles accounted for 365 accidents; handling accidents afloat doubled those ashore.
- Vehicle/aircraft collisions ranked second with 231; the ratio of these accidents ashore to those afloat—more than 3 to 1.
- Ashore, fires resulting from refueling mishaps destroyed 3 aircraft, damaged 2 others.
- Afloat, 6 planes were lost over the side while being moved or as a result of inadequate tie-down security.
- Of the 9 fatalities, 7 were sucked into intakes or walked into rotating props; 5 of the 7 occurred aboard ship.
- Ground handling accidents occurred at the rate of 2.4 per 10,000 flight hours.
- The cost of repairing and/or replacing aircraft is increasing.

Many units reported accidents due to carelessness on the part of those directly involved, without suggesting remedial action. These reports leave much to be desired in the field of ground accident prevention. At best, only cursory preventive measures can follow cursory accident analyses. Reducing the term "carelessness"

to elements such as lack of indoctrination, ignorance, sloppy practices, bravado, . . . will reveal underlying causes and provide guidance for correcting same.

Reports which reflected thorough analyses found causes such as insufficient guidance, direction, and supervision. As a result, sound remedial action was taken.

The new ground accident reporting form, OpNav 3750-10 (rev. 4-59), is designed to help accident investigators get all the facts. Only with these facts can we launch an aggressive ground accident prevention attack and achieve an improved ground accident picture.



LIGHT-OFF

AFTER a fuel change the F9F was run up prior to a test flight for engine rumble and vibration. The start appeared normal to the pilot but shortly afterwards a muffled explosion followed by fire occurred. A prompt shutdown was followed by abandonment of the aircraft. The pilot did not take time to shut off the fuel flow or master switch. Attempts to fight the fire with hand extinguishers were unsuccessful. Station fire fighters extinguished the blaze some 30 minutes later. Major damage was received by the aircraft, photo above.

When the lower filter assembly was replaced it was improperly seated* (see photo inset above) creating a gravity leak when the fuel tank shut-off valve was opened. A pressure leak was created when the low pressure boost pump was turned ON. This escaping fuel entered the plenum chamber and collected in the bottom of the fuselage. When the engine light-off occurred this fuel ignited causing the fire and explosion.

No inspection of the work or a pressure check of the fuel system had been made.

Recommendations following the accident included a thorough inspection of completed work and a fuel pressure check to determine the integrity of the fuel system.

The accident board noted that had foam and CO_2 been directed into the air inlet ducts during the initial stage of the fire fighting the damage would have been greatly minimized.

* Maintenance errors of this type have also occurred in oil filter unit covers of F8U and F4D aircraft.

TURBO JET ENGINE FUEL SYSTEM INTEGRITY CHECK—A number of aircraft losses have been reported which were the result of fuel and oil system fires, which could have been prevented by adhering to proper maintenance procedures. Due to the high fuel pressures encountered in modern day jet engines, it is mandatory that all personnel working with jet engines become fuel integrity conscious. No fuel leaks regardless of size can be overlooked. Let's review a few critical points:

● Overall fuel integrity is the responsibility of each man working on jet engines.

● During periodic inspections and whenever work is being accomplished internally on the engine, torque tables must be strictly complied with when tightening all nuts, bolts and fittings. Proper positioning and alignment of replacement parts, fuel hoses, and observing tube chafing limits are mandatory. Extreme care must be exercised to avoid damage to mating surfaces.

● The above also applies to external areas when the engine is installed.

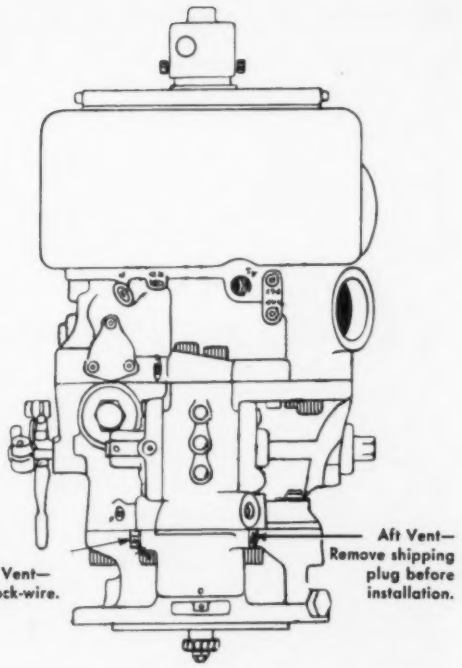
● Whenever the fuel system is broken by removal of a component or fuel lines, insure that they are properly replaced and proper torque applied. Consult the applicable Handbook of Maintenance Instructions for the proper connection points for components or fuel lines and for proper torque limits.

● During periodic inspections on certain aircraft when the tail section is removed and the engine fuel integrity has been broken, the engine is to be run up and a complete visual inspection of the engine fuel system is to be conducted before the tail section is replaced, except in the below noted instances.

(1) The A4D-1/2, TV-1/2, T2V-2 and Regulus Missile engines will not be turned up without the tail section installed, due to engine damage which may result.

(2) Whenever work is accomplished on the engine or the airframe while the tail section is installed, and a fuel integrity check is required, the tail section need not be removed for turnup. But, inspection doors must be opened and inspection covers removed to insure maximum visibility of the area in which the work was accomplished.

● During each preflight and postflight inspection, strict compliance with the fuel integrity inspection portion of the preflight and postflight inspection sheets is mandatory.—*Excerpts from ComNavAirPac General Aircraft Bul. 5-59*



J48 FUEL CONTROLS—Fluctuating engine RPM caused a recent F9F takeoff abort. Fluctuation resulted from improper venting of the fuel control aneroid capsule caused by FAILURE TO REMOVE THE YELLOW SHIPPING PLUG FROM THE ANEROID CAPSULE VENT. A tag stating "Remove Plug Before Installing Unit" was still attached. (For two previous cases of improper fuel control venting see "Crossfeed" No. 7 of 1 June 1959.)

FUEL DYE FOR LEAK DETECTION—The use of dye to determine the source of fuel leaks has proved beneficial when the source of the fuel leak is hidden by structure or the leakage may be coming from two different tanks. Level of leakage can also be detected by controlling the fuel level in the cells.

Since dye is available in several colors, the different colors can be put in separate cells, thereby isolating fuel leaks to a specific cell. If a releak occurs, a new color dye can be used to avoid confusion with the old dye deposits. Care should be taken with the use of multiple colors to prevent them from mixing together.

The powdered dye should be mixed with a small amount of JP-4 fuel before it is used in a fuel cell. Approximately one ounce of powdered dye may be used for each 100 gallons of fuel. How-

ever, in all cases use a minimum amount of dye.

Care should be used when putting the dye into the fuel cells because unmixed dye may settle in the fuel sumps. To provide a uniform mixture, the fuel should be agitated as the dye mixture is introduced into the tank.

Applicable technical manuals and safety precautions for refueling and defueling the airplane should be reviewed prior to starting the leak detection test. The suggested sequence of steps for leak detection is as follows:

Drain the fuel cell or cells that are to be checked for leaks.

Mix thoroughly the applicable amount of dye with JP-4 fuel in a container.

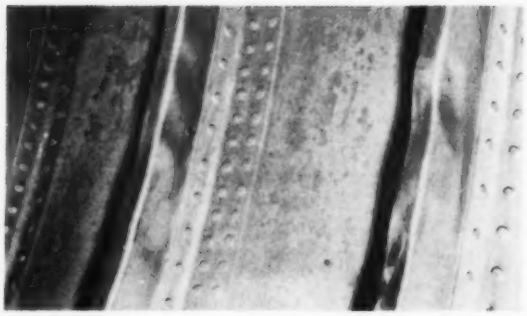
Pour the pre-mixed dye solution into the affected fuel cell and fill the cell to ⅛ level with JP-4 fuel. Allow the fuel cell to set for approximately six hours or until dye appears at the leak source.

Further checking for fuel cell leaks can be accomplished by adding more dye mixture to the fuel cell and filling to ⅔ level and full level as necessary. In some cases it may be necessary to allow the fuel cell to set for approximately twelve hours.

After the leaks have been located, the dyed fuel may be transferred to other fuel cells and utilized in normal engine operation without any adverse effects. Excess dye stain in the fuel cell or cavity may be removed with a clean cloth, however dye stains lose color over a short period of time, thus eliminating the need for procedures to remove all stains.

Information on the use of dye in JP-4 fuel is covered in USAF T.O. 42B1-1-10, "Use of Dye in JP-4 Fuel to Detect Fuel Cell Leaks." Known sources of colored dyes are: National Aniline Division, Allied Chemical and Dye Corporation, New York 6, New York, and E. I. Dupont de Nemours and Company, Inc., Petroleum Chemical Division, Wilmington 99, Delaware. Branch sales offices and distributors for these dyes are located in most large cities.—*Boeing Service News*

WRITE-UPS—Returning from a flight, the pilot entered on the squawk sheet: "Something loose in the tail." Next morning, he found the following reassuring note: "Something loose in tail tightened." (Flight Safety Foundation, which reported this item, added: "Brevity is fine, but explicits elicit more efficient fix-it.")



Titanium warps from temperature changes. This may or may not be detrimental, depending of course on the temperature.

TITANIUM COLOR CHANGE AND WARPING—Titanium, like the chameleon, has the characteristic of changing color, and temperature changes bring out a wide range of colors in titanium material. The color of the metal changes on a time and temperature curve, and in the following order: original metallic; straw; purple; blue greenish gray with a powdery cast; and just before complete destruction, a tannish powdery coat. The purple and blue colors are commonly found at normal operational temperatures. An oxidized coat formed on the surface indicates a certain degree of deterioration; however, the exact degree of deterioration can only be determined by laboratory testing, which cannot be done without removing a sample from the airplane. Warping alone is no proof that the material is "overtemperatured," as warping is due to uneven temperatures over the surface of the metal and stress relieving of the structure. These uneven temperatures could be well below those detrimental to titanium.

The warping of material to the extent shown in the photograph would warrant replacement, because titanium is difficult to hand-form. The addition of reinforcing angles which would draw the warped angles back into line would be another fix. If frame warpage is minor and no color change can be detected, an attempt to straighten the frames may be made. If after straightening the frames no cracks are formed, they should be serviceable with the normal inspection for cracks outlined in the applicable inspection directives.

The incorporation of an example of the colors involved in the Structures Repair Manual would be impractical due to the variances in color, printing, and reproduction. However, the above information as well as a repair to cover the reinforcement of warped Titanium frames will be considered for incorporation in the next revision of the Structures Repair Manual —*NAA Service News*

MAINTENANCE CHECK-UPS — Discrepancies and practices noted by roving maintenance safety team as follows:

► Many instances of hydraulic and engine oil in bilges of aircraft.

► Tools still being left adrift.

► Improper care of ground handling equipment.

► One case found where a penny was installed on the blow out disk of a LqOx cart.

► Several instances of performing maintenance work in the hangar and on the line with a "hot" seat.

One squadron had implemented the practice of striving to catch pilots not making thorough preflight inspections. Tools were purposely left adrift, equipment not properly secured, etc., in order to see if all pilots properly preflighted the aircraft. The results were revealing and immediately brought about good preflight inspection techniques. It was recommended that this practice be implemented in other squadrons.

Improper handling of hot brakes, wheels and tires. It was stressed that CO_2, water or foam is *not* to be used as a cooling agent.—*ComFAir Jax*

EQUIPMENT MAINTENANCE—During removal of a J-71 engine from an F3H-2 for periodic check, the engine became separated from the restraining cable, ran free along the guide track, sheared aft and forward skates on the track end stop and fell to the deck. The engine sustained overhaul damage.

The cause of the occurrence was a failed forward engine roller assembly bracket. The engine restraining cable and fitting was connected to this bracket by a pip pin. Tension was then applied to the cable and the engine lifted from its forward mount. The forward engine roller assembly bracket parted and released the engine.

Failure of the roller assembly bracket can result from one or a combination of the following:

Imperfect casting of the bracket.

Induced fatigue from rough handling and/or repeated use of the assembly.

Induced overloads as a result of improper operation of an engine removal winch used at some time with this roller assembly.

Corrective Action:

► Inspect each forward engine roller assembly prior to use for evidence of fatigue or other failure.

► Inspect engine removal winch assemblies for designed operation or possible overloading.

CANOPY SAFETY CLAMP—A mechanic, running up an A4D-2 lowered the seat and while the seat was moving down, the canopy bungee exploded, ejecting the canopy from the aircraft.

The canopy was closed but not locked just prior to its ejection. The ejection seat was dearmed. The removable plate on the right side of the ejection seat face screen cover had been removed during the de-arming process and allowed to dangle. The bungee release cable is routed through a guide on this plate. As the seat lowered the dangling plate crimped the cable enough to actuate the bungee release. The bungee safety clamp was not in place.

Canopy of A4D-2 was blown because safety clamp was left off.

The safety clamp should be installed whenever any type of maintenance is being accomplished on an aircraft.

COTTER PIN POSSIBILITY—On a night mission the pilot of an F4D was making a high speed letdown on afterburner. At 28,000 feet he came out of burner and noticed a loss of power to 75%. The power stuck at this setting and the pilot finally ejected over water at 6000 feet when it became evident he could not make a field.

It was determined from checking other aircraft that the most probable cause factor was a nut backing off in the throttle control linkage because of a missing cotter pin. The pilot was recovered after 13 hours in the water.

AIRCRAFT BATTERY EXPLOSIONS—Battery explosions and/or loss of d.c. electrical power are usually the result of a failure or malfunction of the aircraft's voltage regulating equipment. While certain aircraft have additional automatic devices to protect the battery and other components from sustained overvoltage, their actuation deprives the pilot of d.c. power. In flight, therefore, an overvoltage condition, whether protected against or not, is always serious.

Some recent reports of overvoltage indicate that faulty adjustment and testing of the voltage regulators have created this condition.

Periodic testing and inspection procedures for your aircraft's d.c. electrical system may be found in the Handbook of Maintenance Inspection. Complete adjustment procedures for your voltage regulators are spelled out in the Handbook of Overhaul Instructions for the particular type of regulator. It is important that these procedures be adhered to.

Conclusions and Recommendations from Selected Engine Disassembly and Inspection Reports

(Provided for use by operating and supporting activities concerned)

J48-P-8 Engine was sent to overhaul for disassembly and inspection following an in-flight fire which resulted in an aircraft accident.

Findings: Disassembly of the engine revealed that the primary cause of the fire was structural failure of the fuel nozzle support at the neck area. The fuel nozzle was broken off from the support assembly. Fuel nozzle support failures are not isolated and are usually discovered when normal torque is applied to the fuel nozzle assembly. This is the first known case of a nozzle support failure at the neck area while the engine was still in service.

Conclusions: This condition is believed caused from insufficient care being exercised at liner removal to ensure that the liner is not rocked from side to side to disengage it from the fuel nozzle support. Rocking of the liner could have caused incipient damage to the neck area of the nozzle support. Liners must be lifted straight out as illustrated in Figure 5-7 on page 143 of the J-48 Handbook of Service Instructions.

Recommendations: Since the combustion chamber liners are the object of frequent maintenance work it is recommended that the precautions stated in the below listed references be re-emphasized to all maintenance personnel:

a. J-48 Engine Bulletin No. 115. Subject: Repair and Replacement of hot section components of turbo-jet J48-P6A-P8 and P8A Engines; instructions for.

b. J-48 Engine Bulletin No. 122. Subject: Combustion Chamber Assembly; disassembly and assembly procedures.

c. J-48 Handbook of Service Instructions AN 02B-10ACC-2, page 143, paragraph 5-23c.

J65-W-4B Engine was removed for metal contamination of the oil system.

Findings: Disassembly did not reveal the cause of contamination. The oil pump strainer part No. 227794 was found with a half-inch tear in the screen.

Conclusions: This torn oil pump strainer is believed to have been caused by installing the front main bearing pre-oil line check valve too far into the pump body and damaging the oil strainer.

Recommendations: Use caution during installation of front main pre-oil check valve elbow to ensure that it is not threaded too far into the pump body.

J65-W-4B Engine was removed for a rear main bearing failure.

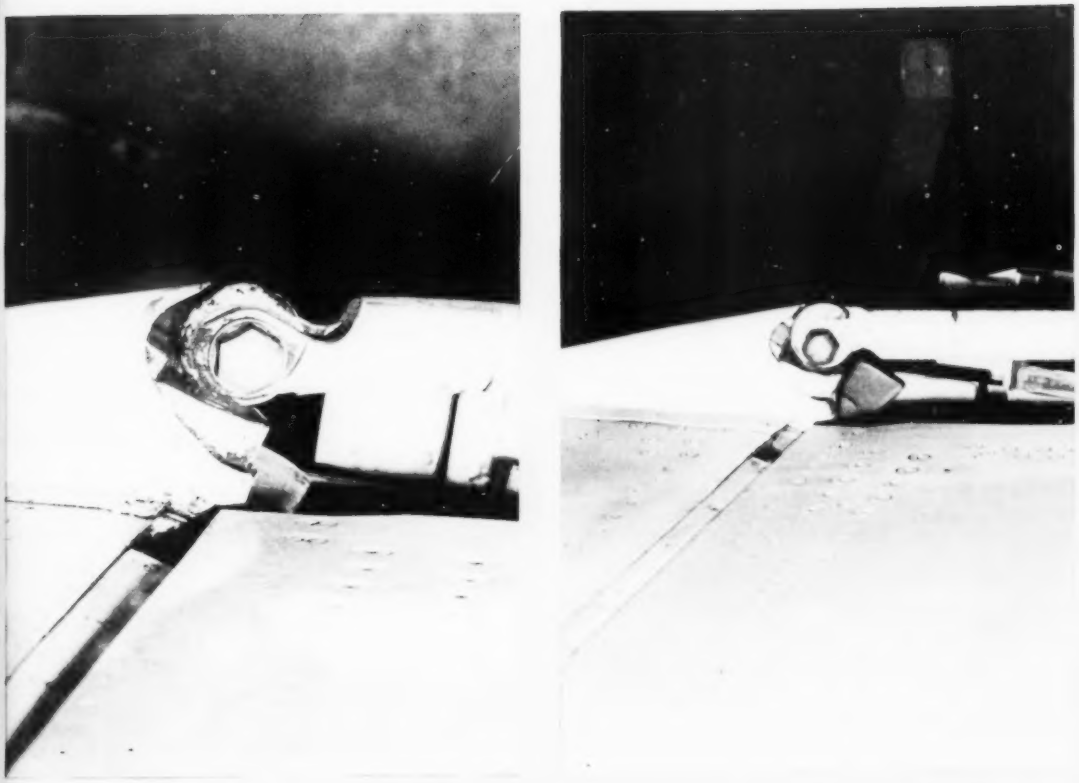
Findings: Rear main bearing failed from lack of lubrication.

Conclusions: Lack of bearing lubrication was caused by reverse installation of the floating tee check valve. The pre-oil tee check valve could have been inadvertently disassembled and incorrectly reassembled by maintenance personnel.

Recommendations: (a) In order to prevent inadvertent disassembly of the tee check valve it is recommended that two wrenches be used for removal of either the pre-oil cap or the hose to the main bearing.

(b) It is recommended that all maintenance personnel concerned with J65 Engines become thoroughly familiar with the contents of J65 Engine Bulletin No. 286. Subject: Pre-oil Check Valve Inspection Procedures; instructions for.

MURPHY'S LAW*



While conducting a preflight inspection of an F4D aircraft the Plane Captain observed a slight bend in the port elevon torque tube. Further investigation revealed the elevon torque tube to be installed incorrectly. The tube was rotated so that the cut-out was away from, (left photo) rather than adjacent to, (right photo) the elevon swivel bushing.

Previous actuation of the elevons had caused contact of the tube and bushing and subsequent bending of the tube as is shown in the photograph, left.—*Contributed by C. N. Conaster, CO, VX-3*

* If an aircraft part be installed incorrectly, someone will install it that way!

CLIPBOARD

Misuse of Guard

THE summary of misuses of Guard Channel indicates that all activities are not reporting misuse.

Many misuses of guard channel are attributed to air traffic control agencies over which they have little or no control. If an aircraft constitutes essential traffic and cannot be contacted on the normal control frequencies, then it may and in many cases does become necessary to use guard channel to establish communications. Towers, Centers, and Approach Control facilities are often put on the spot because the aircraft does not have the proper frequencies.

Commands and Clearance activities could help to improve the situation on proper use of guard channel by making it mandatory for all aircraft to have installed all necessary enroute and terminal (approach control) frequencies. The use of manually tunable UHF equipment should have all but eliminated this problem on UHF. However, proper indoctrination by commanders of aircraft operating facilities and/or by clearance authorities of each aircraft command, on the required frequencies necessary to properly perform the flight is indicated.—*Norfolk Search*

FAA Pegs Bad Habits

". . . Getting more specific, they offer a couple of 'violation-starters' you may recognize. Failure to write ATC clearances or to write them correctly; sloppy altimeter setting procedures; failure to re-estimate significant changes in ground speed between fixes; inattention to traffic when VFR on IFR plan; insufficient nav charts and procedures available to the crew; and sub-standard preflight planning. Take any one of these, and you have a 'do-it-yourself' violation in the making . . ."—*Skyways*

Need Help?—Ask

IT IS a simple fact of life that many problems simply cannot be solved at the local level. And, it is certainly no sign of weakness to ask for help after one has done everything possible to help himself. On the contrary, it is plain common sense.—*MATS Flyer.*

White-Out Hazards

LACK of depth perception aids on final approach over snow-covered terrain continues to be a hazard to our pilots. Many bases mark the edges of runways and overruns with small evergreen boughs or trees to give the pilot a visual depth perception aid. Another system employs sea marker dye. The dye is mixed five parts water, five parts sea dye, one part alcohol. Brightly colored frangible stakes are also a possibility. Full intensity runway lights will aid in judging height above the runway and at the same time help to keep oriented in the pattern when other markings are not visible. Any system used is an aid in the accident prevention program. Don't wait for an accident to happen!—*ARDC FS Newsletter*

Spud Locker Avoidance

DURING qualification landings on a carrier, the F8U pilot began to settle near the ramp and pulled the nose up resulting in further settling. The hook and the tail assembly hit the ramp and the aircraft boltered, subsequently landing at a field.

Analysis: This is the 13th undershoot of a CV ramp this fiscal year. A review of Carrier Pilot Evaluation Sheets to date indicates that the settling at the ramp starts with a high or fast start on the glide slope, a reduction in power to get on the glide slope, and movement to the stick rather than an addition of power to hold the glide slope. In the groove the power required is not quite enough to hold the glide slope and the aircraft drops below. A large addition of power follows to arrest the settling and in nine times out of ten results in a climb at the ramp. The tenth time the power is put on too late and the stick is pulled back, which increases the drag and causes further settling.

Action: The LSOs must watch particularly for this type of approach, especially if a pilot gets away with it the first time. If he spots any tendency to get low in the groove or slow or cocked up on the glide slope, he must warn the pilot sooner to make a power correction. Most of the undershoots have followed the second or third low in the groove approach, so unless the pilot makes a positive correction to his last approach, it is just a matter of time and he is headed for the spud locker.—*ComNavAirPac "Pinpoint" Report*

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